PROCEEDINGS

OF THE

CALIFORNIA ACADEMY OF SCIENCES

FOURTH SERIES

VOL. VI, Nos. 8 and 9, pp. 223–294, pls. 3–17. JUNE 23, 1917

VIII

Report of the President of the Academy for the Year 1916

BY

C. E. GRUNSKY

President of the Academy

IX

Report of the Director of the Museum for the Year 1916

BY

BARTON WARREN EVERMANN

Director of the Museum

SAN FRANCISCO

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GEORGE C. EDWARDS, *Chairman*

C. E. GRUNSKY — BARTON WARREN EVERMANN, *Editor*

PROCEEDINGS

Fourth Series

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Pages 57–72. Water Birds of the Vicinity of Point Pinos, California. By Rollo Howard Beck. (*Issued September 17, 1910*)..... .25

PROCEEDINGS

OF THE

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VOL. VI, Nos. 8 and 9, pp. 223-294, pls. 3–17. JUNE 23, 1917

VIII

REPORT OF THE PRESIDENT OF THE ACADEMY FOR THE YEAR 1916

BY

C. E. GRUNSKY

President of the Academy

In view of the fact that the work of the California Academy of Sciences, its purposes and aims, were rather fully set forth in the various addresses delivered at the dedication of its Museum Building in Golden Gate Park last September, this annual report will be brief and devoted in the main to a summarization of such facts and events as seem worthy of special mention.

No special effort has been put forth during the last year to swell the Academy's membership list. The accession of new members has nevertheless a little more than offset the losses by death and resignation. The present membership in the Academy is 483, made up of:

Patrons	5
Honorary Members	26
Life Members	83
Members	369

During the year 1916 there was an accession of 33 new members, and the Academy lost by death 5, by resignation 11, and by being dropped for arrearages in dues 6; leaving a net gain in membership of 11.

The losses by death were:

Davis, Mr. Horace	Life Member	July 12, 1916
Gutzkow, Mr. Frederick	Life Member	May 7, 1916
Leszynsky, Mr. S. L.	Member	March 8, 1916
Sclater, Dr. Philip Lutley	Honorary Member	———, 1916
Trask, Mrs. Blanche	Life Member	Nov. 11, 1916

The Academy carries on its list of patrons the following names:

Alvord, William	Bourn, William B.
Crocker, Charles	Crocker, William H.
Hendrie, John W.	Dunne, Peter F.
Lick, James	Grant, Joseph D.
Hosmer, Mrs. Charlotte	Morrison, Alexander F.

Of these the last six are the surviving members. Two other public spirited citizens, Mr. Herbert Fleishhacker and Mr. A King Macomber, have recently very generously offered to instal large habitat groups in the Museum, whereby they will become patrons.

LECTURES

During the year 1916, 11 free lectures have been delivered at the stated meetings of the Academy, as follows:

JANUARY 19. "Bird and Animal Life of the Yosemite Region."
Tracy I. Storer, Assistant Curator of Birds, Museum of Vertebrate Zoology, University of California.

MARCH 15. "The Gulls in and about San Francisco."
Joseph Mailliard.

APRIL 19. "Bird Life as seen through a Camera."
Dr. J. Rollin Slonaker, Professor of Physiology, Stanford University.

MAY 17. "The Relation of our Salmon and Trout to Forest Conservation."
N. B. Scofield, Expert in charge of the Department of Commercial Fisheries, California State Fish and Game Commission.

JUNE 21. "Game Conditions in Great Britain vs. Conditions in California."
Carl Westerfeld, California Fish and Game Commissioner.

JULY 19. "Horticultural Quarantine."
Frederick Maskew, Chief Deputy Quarantine Officer of the California State Horticultural Commission.

AUGUST 16. "A Naturalist in the Bahama Islands."
Dr. Charles Lincoln Edwards, Director of the Los Angeles Zoological Park and Aquarium.

SEPTEMBER 20. "The Fur Seals and other animals of the Pribilof Islands."
George A. Clark, Academic Secretary of Stanford University.

OCTOBER 18. "The Physiographic History of the Southern Sierra and Mojave Desert Regions."
Dr. John P. Buwalda, Instructor in Geography, University of California.

NOVEMBER 15. "Japanese Pearl Fisheries."
Prof. C. A. Kofoid, Department of Zoology, University of California.

DECEMBER 20. "The California Pocket Gopher as a Useful Animal."
Dr. Joseph Grinnell, Director of the Museum of Vertebrate Zoology, University of California.

In addition, Sunday afternoon lectures are being delivered in the Museum building, since October. The list for 1916 embraces the following:

OCTOBER 22. "Picturesque India."
Dr. Walter K. Fisher, Stanford University.

OCTOBER 29. "To the Tip-top of the United States in Quest of the Golden Trout."
Dr. Barton W. Evermann, Director of the Museum.

NOVEMBER 5. "A Trip to the Southern Sierra Nevada and the Cañon of the Kern."
Dr. Roy E. Dickerson, Assistant Curator of Paleontology.

NOVEMBER 12. "The Argentine Ant; a Pest from South America."
Prof. C. A. Woodworth, Department of Agriculture, University of California.

NOVEMBER 19. "Ups and Downs of the Pacific Coast."
Prof. R. S. Holway, Department of Geography, University of California.

NOVEMBER 26. "Some Common California Mammals."
Dr. Joseph Grinnell, Director of the Museum of Vertebrate Zoology, University of California.

DECEMBER 3. "Injurious Insects."
Prof. E. A. Essig, Department of Agriculture, University of California.

DECEMBER 10. "Turtles of the Galapagos Islands."
Dr. John Van Denburgh, Curator of the Department of Herpetology, California Academy of Sciences.

ACCESSIONS TO THE MUSEUM AND LIBRARY

Among the notable donations with which the Academy's collections of material and of books have been enriched during 1916, the following may be noted:

Argentine Government, through Hon. Enrique M. Nelson, Commissioner-General, Panama-Pacific International Exposition: Thirty-nine specimens of mounted Argentine birds; eight mounted specimens of native mammals; 10 boxes of exhibits of native insects; 10 framed colored drawings of Argentine plants; one stereoscope and 37 slides; exhibit illustrating water filtration; specimens of Argentine plants.

Branner, Dr. John C., Stanford University: 55 bound volumes.

California Botanical Club, through Miss Alice Eastwood: A collection of 397 specimens of Mexican plants collected by Dr. Edward Palmer in 1910, purchased for $39.80 by the Club.

Crocker, Mr. William H.: Three large folios, "Japanese Temples and their Treasures."

Evermann, Dr. Barton W.: Ten manganese nodules dredged by the U. S. Fish Commission Steamer Albatross in the South Pacific during the Agassiz-Albatross South Pacific Expedition of 1899-1900, and a collection of garnets from St. George Island, Pribilof Group.

Grant, Mr. J. D.: One buffalo skull from the Klamath River.

Heyer, Mrs. H. C., San Francisco: Sixty-one specimens of Alaska birds, chiefly water birds.

Kelly, Mr. James H., Tiburon, Cal.: Twenty-one numbers of the earlier publications of the Academy.

Logan, Mr. Hugh B. Baker, Ore., through Mr. John W. Mailliard: One skin of the Mountain Coyote (*Canis latrans lestes*), male, from North Powder, Baker Co., Oregon, and one skin of the Pallid Barred Wildcat (*Lynx fasciatus pallescens*), male, from Salisbury, Baker Co., Oregon, both collected by the donor.

Martin, Mr. Bruce: 627 insects collected in Colombia, South America, including some very interesting forms.

Mailliard, Mr. John W.: Two specimens of the California Condor (*Gymnogyps californianus*), collected in San Diego Co., California, by E. B. Towne.

Merriam, Dr. C. Hart, Washington, D. C.: A collection of 486 specimens of Atlantic coast mosses, comprising 65 genera and 181 species, all new to the herbarium.

Smith, Mr. L. E., Sisson, Cal.: One hundred and forty-nine bound volumes.

Snodgrass, Mr. R. E.: Seventeen volumes and 13 pamphlets, concerning the Galapagos Islands.

Tobin, Mr. J. S.: Cash donation, $250.

U. S. Fisheries Steamer "Albatross": Twenty-one bird skins; 181 jars, vials and bottles of specimens of fishes, sponges, molluscs, crustaceans, etc.

PUBLICATIONS

The Academy has published during 1916 the following papers in continuation of the Fourth Series of the Proceedings:

Vol. V, No. 7, pp. 195-201
REPORT OF THE PRESIDENT OF THE ACADEMY FOR THE YEAR 1915
by C. E. Grunsky, President of the Academy.

Vol. V, No. 8, pp. 202-223
REPORT OF THE DIRECTOR OF THE MUSEUM FOR THE YEAR 1915
by Barton Warren Evermann, Director of the Museum.

Vol. VI, No. 1, pp. 1-17
EOCENE OF LOWER COWLITZ RIVER VALLEY, WASHINGTON
by Charles E. Weaver.

Vol. VI, No. 2, pp. 19-40
THE POST-EOCENE FORMATIONS OF WESTERN WASHINGTON
by Charles E. Weaver.

Vol. VI, No. 3, pp. 41-52
THE OLIGOCENE OF KITSAP COUNTY, WASHINGTON
by Charles E. Weaver.

Vol. VI, No. 4, pp. 53-85
THE PACIFIC COAST RACES OF THE BEWICK WREN
by Harry S. Swarth.

Vol. VI, No. 5, pp. 87-128
MONOGRAPH OF THE NORTH AMERICAN SPECIES OF ORTHOTYLUS (HEMIPTERA)
by Edward P. Van Duzee.

Vol. VI, No. 6, pp. 129-213
A CATALOGUE AND HOST LIST OF THE ANOPLURA
by G. F. Ferris.

Vol. VI, No. 7, pp. 215-221
FOUR SPECIES OF SALAMANDERS NEW TO THE STATE OF CALIFORNIA, WITH A DESCRIPTION OF PLETHODON ELONGATUS, A NEW SPECIES, AND NOTES ON OTHER SALAMANDERS.
by John Van Denburgh.

Title pages and Indices for Fourth Series, Proceedings, Volumes IV and V, have also been printed but have not yet been distributed.

The notable event in the affairs of the Academy which marks the beginning of a new epoch in its history, was the dedication on September 22, 1916, of the new Museum building in Golden Gate Park, with a first view by members and their friends of the habitat groups of which, at that time, 11 principal groups and a number of lesser groups had been completed. The exercises on that occasion have been made a matter of record and I desire at this time only to renew the assurance to those who have made so much accomplishment possible of the sincere appreciation by all members of the Academy of the generosity and good will which has found such happy expression in this building and its contents.

Of the 11 principal groups the three bird groups were made possible by special donations as follows:

The Farallon Bird Group, by Mr. Wm. H. Crocker.

The San Joaquin Valley Bird Group, by Mr. Jos. D. Grant.

The Desert Bird Group, by Mr. Wm. B. Bourn.

I may note in connection with the installation of habitat groups that the Academy no longer commands the services of Mr. John Rowley, under whose supervision the habitat groups have been installed. Mr. Rowley has gone to the Municipal Museum of Oakland.

I cannot refrain from commending again the results of Mr. Rowley's work. The groups which have been installed portray nature, and especially the various animals therein presented, with remarkable fidelity. The general arrangement and effect of each group is pleasing and all will bear the closest inspection.

The fact that Mr. Rowley will be active in such close proximity to San Francisco as Oakland, prompts the hope that for special work as occasion arises his services will still be available.

The Academy has been fortunate in securing the services of Mr. E. P. Van Duzee as Curator in the Department of Entomology and as active Librarian. The proper housing of the Library and the attention which it is now receiving have added greatly to its usefulness.

In the other departments of the Academy's work there has been no material change.

What has been done in these various departments will be set forth by the several curators and it would be but repetition to dwell upon their activities in this general statement of affairs.

The Director of the Museum, Dr. Evermann, will report in some detail upon the Museum and research work which has been accomplished and of the cordial appreciation which the public is manifesting in the Academy's work.

In order to make possible what has thus far been done on and in the museum building, the Academy has had to live beyond its income for several years. It has been necessary to add to our indebtedness about $35,000. This is not a serious matter but is cited as an evidence of the efforts of your Trustees and Officers to make the collected scientific material available for examination and study at the earliest possible date.

The estimated assets of the Academy are about $1,400,000, mainly represented by the Market Street property, against which there are liabilities of about $336,000. The net annual income may be stated in round numbers at about $50,000. It is expected that of this amount about $10,000 per annum can during the next few years be held available for reducing our financial obligations.

There is not yet any prospect for the enlargement of the museum building, which would only be possible by outside aid. The space which has thus far been made available is, of course, inadequate to meet prospective requirements. All friends of the Academy should, therefore, as opportunity offers, call the attention of those who are financially able, to the good work which an ample additional endowment would make possible.

In closing, I desire to express on behalf of the officers of the Academy their appreciation of the interest manifested by the members, and desire also to extend my personal thanks to the officers and members for their cordial support and also to the employees who have so willingly made sacrifices in the interest of the Academy whenever called upon to do so.

IX

REPORT OF THE DIRECTOR OF THE MUSEUM FOR THE YEAR 1916

BY

BARTON WARREN EVERMANN

Director of the Museum

At the time of the last annual report of the Director of the Museum (February 16, 1916), the actual installation of the habitat groups of California mammals and birds was well under way.

Besides the regular employees of the Division of Exhibits, who devoted all their time to the habitat groups, three extra temporary men were employed on that work for nearly a year. By the twenty-first of September the following groups had been completed:

California Valley Elk, Black-tail Deer (summer group), Northern Mule Deer (winter group), Antelope, Desert Mountain Sheep, Mountain Lion, Black Bear, Leopard Seal, California Sea Lion, Steller's Sea Lion, Raccoon and Striped Skunk, Coyote, Farallon Islands Bird Rookery, San Joaquin Valley Spring Bird Group, and Desert Bird Group. Opportunity has been taken to reproduce in this report excellent photographic illustrations of a number of these habitat groups.

In addition to these 15 groups the California Condor Group was complete with the exception of the birds, which will be secured later. Small groups of the California Valley Quail and the Western Meadowlark were also completed.

It was felt that the time had arrived for the dedication of the Museum building and the opening of the Museum to the public. The formal dedicatory exercises were held on Friday afternoon, September 22, in the California mammal room of the Museum.

Mr. C. E. Grunsky, the President of the Academy, presided.[1] The invocation was by the Right Reverend William Ford Nichols, bishop of California. Brief addresses were

[1]A report of the opening exercises was published in *Science* for October 27, 1916, pp. 598-603.

made by the following: Mr. William H. Crocker, President of the Board of Trustees; Mr. C. E. Grunsky, President of the Academy; Mr. Edward Rainey, for the Mayor; Mr. George Haviland Barron, Curator of the Memorial Museum, San Francisco, for the Board of Park Commissioners; Dr. David Starr Jordan, Chancellor Emeritus, Stanford University; Dr. Barton Warren Evermann, Director of the Museum.

Mr. Crocker spoke feelingly of his long connection with the Academy, as President of the Board of Trustees continuously since 1898, or 18 years. Before him his brother, Charles F. Crocker, had occupied the same position for a number of years and his father, Charles Crocker, was deeply interested in the Academy.

As president of the Board of Trustees, Mr. Crocker formally dedicated the new Museum building to the advancement of the biological and physical sciences and the educational interests of the city of San Francisco and the state of California. He then turned the building over to the Academy.

Speaking of the history and the aims and ambitions of the Academy, President Grunsky said, in part:

> Organized in 1853, the California Academy of Sciences has now for 63 years been conducted along broad lines for public service. Membership in the Academy at a nominal annual fee is open to all who are interested in the study or advancement of science. Its activities are directed mainly along educational lines in providing the material and opportunity for securing information on matters pertaining to the natural sciences; and second, along lines of research and study in the various subdivisions of the natural sciences.
>
> There are those present today who will recall, and some who were active in, the activities of the Academy while it was quartered in a building at the southwest corner of California and Dupont streets, and there are many here who have enjoyed and who have profited by the natural history museum and its accessories maintained for many years prior to the great disaster of 1906 on Market between Fourth and Fifth streets.
>
> It would be needless to present at this time a review of the history of the Academy and of the work done by it. Those who desire will find much of interest and of value in the published records of the Academy's Proceedings.
>
> It would be futile to give a due meed of credit to those heretofore connected with the work of the Academy whose contributions have borne fruit, and whose achievement is expressed in some measure in the Museum plant now to be brought closer to the general public. It must suffice to say that at all times in the history of the Academy there was a group of

enthusiastic scientific workers—with changing personnel—who stood ever ready to make, and did make, the sacrifices and put forth the personal effort which made the work of the Academy worth while.

In the matter of publications, as in the case of its other activities, the Academy has had to accept the limitation upon its output made necessary by the lack of adequate funds. Much has been left undone which ought to be done. Time will not, however, permit me to take up this matter for full presentation. Let me call attention merely to one fact which will be patent to all who look carefully into the affairs of the Academy. The field in which the Academy is active is but imperfectly covered; nor can it be covered as it should be without adequate support from those of means who, in furthering the aims of the Academy, will not alone be benefiting our city and commonwealth, but will be contributing to the sum of human knowledge.

The building which has here been erected and is today being dedicated is located upon public ground. The Academy has invested in it $183,000. Yet this building, while it is an earnest of what the Academy is willing to do for the public, represents, in area occupied, only about one-third of that of the museum building which we hope some day in the near future will be completed on this site.

To accomplish the incomplete work with which we desire you to become better acquainted, the Academy has taxed its resources as far as seemed wise and has made it possible to open to the public, housed in the first unit of its museum building, certain exhibits which will forecast what it is hoped may ultimately be adequately accomplished. There should be here assembled material from the Pacific Ocean and its shores representative of all the natural sciences, more complete than can be found elsewhere. It can be done and will be done, but not without outside aid. The resources of the Academy, chiefly the result of bequests and endowments that will be referred to later, are limited and our installations and facilities for housing material always obtainable in abundance must progress slowly unless the Academy can count on the generous assistance of those who have the means.

We can not at this time announce when our building will be extended. More material for research and exhibition has already been collected than we can properly display. Some of the most striking habitat groups that should be at once installed must wait until more funds are provided and in some cases until the time has come when we can add to the building.

It has been suggested that the Academy should extend its activities by assuming the management of an aquarium. I think I speak for every member when I say that the Academy is ready to do this. But even though there are those of our citizens who may be willing to erect and equip the necessary buildings the Academy is not so circumstanced that it can provide the funds for maintenance and operation. But its staff and its organization including the services of its Director of the Museum, Dr. Evermann, an expert in matters relating to fishes and the fisheries, are ready to help and will help. San Francisco should have an aquarium filled with

the life of the Pacific Ocean and of the streams discharging into the ocean, second to no other aquarium in the world.

The Academy has asked you to be present today at this dedication of the first unit of its museum building in order that you may become better acquainted with the Academy's aims and purposes and as a reminder to the public that the Academy is here to benefit and serve the whole community.

It is appropriate that at this time attention be called to the generous aid which the Academy has received in the past and to that which it is now receiving in its plans for an enlarged field of usefulness.

It should be remembered that the Academy is in Golden Gate Park with the consent of the people of San Francisco, who have seen fit to increase the Academy's opportunity for service by permitting the erection here of the necessary museum buildings. This consent was given in 1910 and ever since that time the plans have been under consideration and in execution which are today beginning to see fulfillment.

By bequest of James Lick forty-one years ago, the Academy became the owner of the Market Street property between Fourth and Fifth streets on which for many years a museum of natural history was maintained. This property, now in use for business purposes, is the Academy's present main source of income. The Lick bequest is now carried on the books as an asset of $802,000.

In 1881 the Academy received from Mr. Charles Crocker an endowment of $20,000, the income from which is to be used in aid of scientific research.

Mr. John W. Hendrie in 1899 bequeathed to the Academy the sum of $10,000, the income from which has been set apart for the publication of scientific papers.

The late William Alvord bequeathed to the Academy the sum of $5,000, to be used in improving and adding to its herbarium.

During the last decade, while husbanding its resources, and collecting the material which is now assembled in the building being dedicated today, the Academy affairs have necessarily received but little publicity and there has been but little opportunity for the public to become acquainted with its activities; nevertheless, the Academy has been selected by many who have collected material of scientific value as the proper institution to preserve the same and make it available for the public. Attention will be called to only a few recent donations the announcement of which is appropriate on this occasion.

Our generous public-spirited fellow citizen, William M. Fitzhugh, has, by purchase and additions thereto, preserved in its entirety the collection of Indian baskets, ornaments, implements and related material made in their lifetime by the late Professor and Mrs. T. S. C. Lowe, of Pasadena. This collection of exceptional interest and magnitude, which would otherwise have been scattered and would have lost value by piecemeal sale, is on display in the Academy Museum as a loan and merits your careful attention.

The most important gift which the Academy has recently received is that of the Henry Hemphill collection of marine, freshwater and land shells. This magnificent collection, the making of which engaged the attention of

Mr. Hemphill during practically all the years of his long and useful life, and which contains between 60,000 and 70,000 specimens representing more than 12,000 species, has been donated to the Academy by Mrs. Charlotte Hosmer, daughter of Mr. Hemphill. The Academy feels grateful to Mrs. Hosmer for this most generous gift.

The installation of the bird-habitat groups which are today being opened to your inspection and which will contribute much to the education and enjoyment of the public has been made possible by the liberality of three other San Franciscans as follows:

Mr. Wm. H. Crocker has presented to the Academy the Farallon Islands bird group.

Mr. J. D. Grant has presented to the Academy the San Joaquin Valley bird group.

Mr. W. B. Bourn has presented to the Academy the Desert bird group.

It is their wish, as it is the wish of every one in any way connected with Academy activities, that these exhibits, and the others, now to be opened to public view, may prove instructive and inspiring and a source of lasting enjoyment to all of those who care to avail themselves of the privilege, open to all, of visiting the museum.

To these donors and to all who have contributed to the service value of the Academy, the Academy, through its President, expresses its sincere appreciation and gratitude.

The Academy welcomes such aid in the accomplishment of its aims and will ever be ready to accept and manage any trust having in view the advancement of science.

Mr. Rainey, representing the Mayor, and Mr. Barron on behalf of the Board of Park Commissioners, spoke of the great benefit which the Museum of the California Academy of Sciences will be to the people of San Francisco. The location of the Museum in Golden Gate Park, the most beautiful "people's playground" in the world, is a guarantee that it will be visited not only by our own people, but by all who come to San Francisco.

Dr. Jordan spoke of the value to general education and to science of natural-history museums. He called attention to the eminent position already attained in the field of scientific research by the California Academy of Sciences, and the prominent place the Academy is destined to fill as a scientific educational institution.

In a reminiscent way, he told of his many years' connection with the Academy, as President in 1896 and 1897, and again in 1900 to 1902, of his first visit to the Academy in 1879, and his pleasant meeting at that time with W. G. W. Harford and Dr.

Albert Kellogg the botanist and one of the founders of the Academy.

Dr. Evermann spoke in part as follows:

In the few minutes allotted to me I shall be able to speak briefly of only one or two of the museum's activities and aims.

The California Academy of Sciences is a scientific, educational institution. As a scientific, educational institution, the Academy, through its museum, has two important functions. The first of these is that of *scientific research.* The museum must furnish men and materials and facilities for scientific investigation. Through its research collections and its field investigations, it must study and solve its share of the multitude of scientific and economic problems which the physical and biological sciences present to us, particularly those presented by the zoology, botany and geology of western America and the broad Pacific. We must do our share in studying and investigating and making known the natural resources of our country. The Academy must contribute its share to the world's contributions to human knowledge.

The second important function of the Academy is *educational.* The Academy must do what it can within its means to be of real service in an educational way, not only to the general public, but also to the public and private schools.

One of the ways in which it is endeavoring to render educational service is by installing in this museum habitat groups of California mammals and birds and other exhibits that possess real educational value and which show the natural resources of the state.

Scientific research requires money and men. Habitat groups such as we are able to show you today also cost money.

The income of the Academy is limited; it is not sufficient to enable the museum to carry on the scientific work which it should do and also build up popular educational exhibits.

We have been able to prepare the splendid exhibits which we have to show you today because of the generosity of a number of public-spirited citizens of San Francisco and by curtailing somewhat for the time being the scientific activities of the Academy. Without the help of these friends of the Academy the valuable and attractive exhibits we have now installed would have been fewer in number. Nor would there have been so many if we had not drawn upon the Academy's funds for scientific research.

We have planned for several additional large habitat groups. We even have the animals on hand for a number of them. I may mention the very interesting elephant seal, a remarkable species of large marine mammal now nearly extinct. We have the animals for the group, but need funds for installing them. We have also the animals for two or three deer groups, a gigantic tortoise group, and a large iguana group. We have planned also for 22 groups of small California mammals, a dozen small bird groups similar to the very beautiful California quail group which you will see in the bird hall, and an indefinite number of small portable habitat groups such as that of the western meadowlark, which may be seen in the

office upstairs. These we propose to loan to the public schools should they desire them.

It is hoped that the necessary funds for these exhibits may be supplied by private donations, so that the net regular income of the Academy may be reserved chiefly for scientific research. The large groups cost from $3,000 to $4,000; the small groups about $500 each; and the portable educational groups about $100 to $250 each.

It is hoped that this opportunity to do something worth while may appeal to those who are interested in education and who have the means to help along in such excellent work. What a splendid thing it would be for San Francisco and the state if, among those present here today, there might be some so impressed with the opportunity to help in this good work that they would provide the means to enable the Academy to add a dozen or more groups to the excellent series so well begun. We have the expert taxidermists and preparators to do the work; we need only the funds to meet the expense.

In conclusion, may I be permitted to mention one other need of the museum, to which I have called attention on another occasion.

It is my ambition that there shall be in this museum a *Children's Room* —a room in which will be displayed natural history objects such as are particularly attractive to little children. There would be in this room brightly and curiously colored birds and butterflies, moths and beetles and other insects; curious animals of other groups; attractive minerals, growing plants, and aquariums with interesting and instructive animal and plant life; colored transparencies of beautiful native flowers, all selected and arranged with reference to the telling of an interesting story, of teaching a definite lesson.

And there will be in this children's room a children's reading room in which will be found a library of all the interesting and reliable nature books and helps to nature study.

And there will be in charge of this children's room a well-educated, kindly, sympathetic man or woman who knows animals and plants; who knows the specimens in the museum and the live things in the park about it; and who, above all, knows and loves children; a man or woman who can wisely direct the observation and the reading of the children so that they may correlate their reading with what they have seen in the museum or in the open, and thus increase rather than stifle their interest in, and love for, animate things, as our public schools almost invariably do. It will be arranged so that children of the different grades will come to this room at different hours, and receive the instruction and help and encouragement adapted to their respective needs.

And all this will be done and done soon, I confidently believe. It will be done because it so evidently appeals to us all as being the *right thing to do,* the right sort of education and training to give our children. It will be done, because the beauty and worth of it all, for the little children's sake, will appeal to some one who has prospered in this world; some one with a kindly heart, who loves children, and who wants to help them to become the men and women they should become; and some day that man

or woman will come forward—I wish it might be today—and, out of his abundance, endow a *Children's Room* in this museum, and thus make it possible for the California Academy of Sciences to do this splendid work for the children of California, not only of today but for those of the years to come.

At the close of the formal dedicatory exercises a private view of the exhibits thus far installed was afforded the museum's guests, of whom nearly one thousand were present in response to the special invitation.

MUSEUM HOURS

The Museum has been open to the public every day since the formal opening, September 22, 1916. The hours for the public are from 10 A. M. to 4 P. M. on week days and from 10 A. M. to 5 P. M. on holidays, including Sundays.

VISITORS AT THE MUSEUM

Attendance at the Museum has been very satisfactory. The number of daily visitors has varied on week days from fewer than one hundred on rainy, stormy days to more than 2,200, and on Sundays from 1,600 to 10,000.

Totals by months are as follows:

September (9 days)	16,448
October	36,933
November	27,718
December	15,002
January	23,170
Total to February 1, 1917	119,271

THE MUSEUM AND THE SCHOOLS

One very gratifying feature is the interest which the public and private schools are taking in the Museum. A large number of teachers have brought their entire schools to the Museum. Whenever possible the Director has accompanied the school about the halls, explaining briefly to the children the various exhibits. When the time of the school would permit the chil-

dren were taken into the auditorium where an illustrated talk or lesson on some one of the habitat groups or other exhibits was given them.

These efforts to help the children to understand the exhibits, to show to the teachers and pupils that the exhibits in the Museum are available as illustrative materials for their regular school work, and to make the Museum of real educational value to them, are appreciated not only by the teachers but by the children as well.

The Academy is glad to be of service to the schools in this and all other ways in its power. It is hoped that even closer affiliation may be brought about and that a definite system for school visits may be arranged in the near future.

LECTURES

The regular course of free popular lectures on scientific subjects has been maintained throughout the year. These have been given at 8 o'clock on the third Wednesday evening of each month.

Soon after the formal opening of the Museum arrangements were made for a Sunday afternoon course of lectures. These have been given in the Auditorium of the Museum and have proved very popular, the attendance at each reaching in nearly every case the full capacity of the hall. Indeed, on a number of occasions, many people were turned away.

The lectures and the subjects are fully set forth in President Grunsky's report.

Through the liberality of Messrs. Wm. H. Crocker, R. J. Taussig, and John W. Mailliard the Academy has recently secured a complete moving picture equipment, including an excellent camera. It is the intention to secure a number of reels illustrative of wild animal life, particularly of the species shown in the Museum's habitat groups.

The success of the Sunday afternoon lecture course is due in large measure to the industry and resourcefulness of Messrs. Roy E. Dickerson, W. W. Sargeant, and Edward P. Van Duzee, to whom, as a committee, all lecture matters were assigned by the Director.

EMPLOYEES

The regular employees of the Museum during the year 1916 have been as follows:

Director and Executive Curator, Dr. Barton Warren Evermann; Curator, Department of Botany, Miss Alice Eastwood; Curator, Department of Entomology, E. P. Van Duzee; Curator, Department of Herpetology, Dr. John Van Denburgh; Assistant Curator, Joseph R. Slevin; Acting Curator, Department of Mammals, John Rowley; Curator, Department of Invertebrate Zoology, Dr. Walter K. Fisher; Chief, Department of Exhibits, John Rowley; Assistants, Arthur L. Bolton, Paul J. Fair, Joseph P. Herring, and Mrs. M. L. Pariser; Assistant Curator, Department of Invertebrate Paleontology, Dr. Roy E. Dickerson; Librarian, Dr. Joseph Grinnell; Assistant Librarian, E. P. Van Duzee; Secretary, W. W. Sargeant; Stenographer and Typewriter, Miss Susie Peers; General Office Assistant, Ignatius W. McGuire; General Museum Assistant, John I. Carlson; Janitor, James H. Chastain; Assistant, Wm. C. Lewis; Janitress, Mrs. Johanna E. Wilkens; Night Watchman, Frank W. Yale; Day Watch, Patrick J. O'Brien.

DEPARTMENT ACTIVITIES

The installation of the research collections of the respective departments having been practically completed before the beginning of the calendar year 1916, the curators and their assistants have been able to devote most of their time to field work for the securing of new material and to the care and study of the collections. The condition and activities of the various departments are set forth in detail in the reports of the respective curators and need be referred to here only briefly.

Department of Botany.—The customary enthusiasm and devoted industry have characterized the department of botany during the year. The mounting and labeling of specimens has engaged much of the time of the curator. In this work she has been materially assisted by the members of the Botanical Club, with whose help the herbarium has been put in excellent condition. Among the members of the Club who have rendered especially valuable service should be mentioned Mrs. Marian L.

Campbell, Mrs. G. Earle Kelly, Mrs. C. L. Pitcher, Mrs. Ernest Meiere, Miss Kate L. Stoney and Miss Lena Gibbs.

Many additions to the herbarium have been made within the year, the most important being a collection of 486 specimens of mosses donated by Dr. C. Hart Merriam; 81 specimens received in exchange from the U. S. National Museum; 100 plants from the Alps presented by Mrs. Zelia Nuttall; and two collections presented by the Botanical Club.

The Curator reports that the needed data for the proper labeling of the plants collected by the Academy's Galapagos expedition have at last been supplied by the collector and it is now possible to correlate the field numbers with those used in the published report.

The Botanical Club, under the supervision of the curator continues to hold weekly meetings and to be active in promoting interest in botanical matters.

The curator has maintained throughout the year in the vestibule of the Museum an exhibit of the flowers of the Park and country. This exhibit receives much attention from Museum visitors and is proving of great educational value.

Department of Entomology.—Mr. Edward P. Van Duzee, who entered upon his duties as Curator of Entomology on June first, has been indefatigable in enlarging the collections in his department, classifying, arranging, and labeling the specimens, and, in general, in making the rich material under his care available for study. During the year he made a number of short collecting trips which resulted in the addition of many valuable specimens. The total number of accessions to the department within the year is 4859.

Certain collections of the department have been sent to specialists for identification and study. The most important of these are the Orthoptera of the Galapagos expedition, sent to Messrs. Hebard and Rehm of Chestnut Hill, Pa., and the Plusiini sent to Dr. F. Ottolengui of New York.

Considerable time has been given by the curator to the determination of specimens submitted by correspondents and others who understand that the Academy is only too glad to be of service in this way.

The curator is putting through the press a synoptic catalogue of the Hemiptera of America north of Mexico, which will prove

one of the most voluminous and important contributions of the year to entomological literature.

Department of Exhibits.—The employees of this department were engaged during the entire year on the installation of habitat groups. As stated elsewhere in this report, 17 groups were completed by September 21. Since that date two other small groups have been partially completed. Certain other exhibits have been temporarily placed in the mammal hall. The principal of these are eight cases of commercial mollusks and crustaceans and a giant clam shell, received from the United States Bureau of Fisheries; eight cases of shells from the Hemphill collection, selected for their educational value and general interest; one case of the edible clams of the west coast of America, presented by Mr. and Mrs. T. S. Oldroyd; one case of minerals, one of fossil fishes, and one of California butterflies.

A very instructive exhibit contributed by the Standard Oil Company has been temporarily installed in the Bird hall. This exhibit, installed without expense to the Academy, is illustrative of the oil industry and attracts much attention.

All these exhibits which do not logically belong in the Mammal and Bird halls will be removed to appropriate exhibition rooms as soon as an additional wing is provided.

Department of Herpetology.—The activities of this department have continued throughout the year with their usual efficiency. Commendable progress has been made in classifying and arranging the collections on the shelves in the stack rooms. This work involves the separation, identification, rebottling, labeling, and card-cataloguing of the entire collection, a task now more than one-third done.

During the year the collection was enlarged by the addition of 1536 specimens.

Considerable field work was done by the assistant curator in Nevada, Utah and Idaho, resulting in valuable collections and a much more complete knowledge of the herpetological fauna of those states.

The collections of this department now number 33,816 specimens, and are among the most extensive in America. The hope of the curator to make the department second to none in

America in completeness and value of material is an ambition which should receive the hearty support of the Academy.

Within the year the department has contributed four papers setting forth results of studies by the curator and assistant curator of the collections of the Academy, two of which have been published. The other two will be printed soon. Other scientific papers are in course of preparation.

Department of Invertebrate Paleontology.—Mr. F. M. Anderson, the curator of this department, was on leave during the entire year, engaged on special work for certain oil companies and the Southern Pacific Railroad. The assistant curator, Dr. Roy E. Dickerson, has shown his accustomed energy and industry in looking after the interests of his department. A large amount was accomplished in preparing, sorting, identifying, and classifying the material in various collections, and putting the general collections of the department in order.

Although the budget allotment to the department was small several field expeditions were successfully conducted,—one to the Simi hills in Ventura and Los Angeles counties, one to the Marysville Buttes, one to the vicinity of Petaluma and Freestone, and one in the area on the southern border of the Mohave Desert, where certain studies in historical geology were made in co-operation with Dr. L. F. Noble of the U. S. Geological Survey.

The assistant curator has been active and productive in original research, and has within the year contributed a number of papers to paleontological literature.

Department of Invertebrate Zoology.—In this department, which is as yet only in the formative stage, the work of the year has consisted almost exclusively in the making of collections for the department. The curator spent a portion of the month of June at Monterey Bay and vicinity collecting desirable material. In the same month some collecting was done in the vicinity of Point Conception.

In co-operation with the Department of Biology of the University of Southern California, two weeks were devoted to dredging about Santa Catalina Island.

The collections of the department have also been enriched by a valuable series of west coast Gephyrean worms and a mis-

cellaneous lot of invertebrates from British Columbia and the coast of California secured from Mr. W. F. Thompson, a small collection of California echinoderms donated by the University of Southern California, a representative series of invertebrates collected in the vicinity of Hilo, Hawaii, by Miss Leslie Tulloch, and a small lot of echinoderms from Boundary Bay, B. C., contributed by Prof. Frank W. Weymouth.

Department of Mammalogy.—As in the previous year the acting curator and his assistants devoted their time to the installation of habitat groups. Little or no time was given to enlarging the collections.

As no catalogue of the specimens in this department had ever been prepared, a proper record book was ordered made, and the collection was catalogued by Mr. Rowley, assisted by Mr. Bolton and Mr. Fair.

The total number of entries is 2300. Very few of the specimens in this department have been accurately identified. There is urgent need of a mammalogist competent to make the identifications and who can add to the collection so that it may become a fair representation of the California mammalian fauna.

Department of Ornithology.—This department being temporarily without a curator, has done no field collecting in the past year. The only additions to the collections are a few specimens received from miscellaneous sources. Mr. L. M. Loomis has continued to make use of the Tubinares of the collection in connection with the preparation of a monograph upon that group of birds upon which he is engaged.

Library.—Mr. Edward P. Van Duzee, who entered upon his duties as assistant librarian June first, came to us with long experience in library work. He had been connected with the Grosvenor Library of Buffalo, N. Y., for 28 years, 10 years as assistant librarian and 18 years as librarian. Although Mr. Van Duzee's primary duties are those of curator of Entomology, he nevertheless devotes a portion of his time to the library. With the assistance of Mr. Ignatius W. McGuire and Mr. John I. Carlson commendable progress has been made in classifying and arranging the books on the shelves. After mature consideration it was the opinion of the assistant librarian that the Decimal classification would best meet our needs, and

that system has been adopted. The miscellaneous books in the main library, numbering some 2650 volumes, have been properly arranged and author and subject cards written by Mr. McGuire and call numbers engrossed by Mr. Carlson on the back of each book and on each card.

The sets of periodicals and publications of learned societies have also been similarly arranged.

San Diego meeting of the Western Society of Naturalists.—As one of the societies affiliated with the Pacific Division of the American Association for the Advancement of Science, which met at San Diego August 9 to 12, 1916, the Western Society of Naturalists held its annual meeting at the same time and place. The Academy was well represented at these meetings, as many as twenty of its members appearing on the various programs for the presentation of papers. Two of the three presidential addresses were given by members of the Academy, the first by Dr. W. W. Campbell, President of the Pacific Division of the American Association for the Advancement of Science, whose subject was "What we know about Comets," the second by Dr. Barton Warren Evermann, President of the Western Society of Naturalists, his subject being "Modern Natural History Museums and their relation to Public Education."

The following members of the Museum staff were present and presented papers: Miss Alice Eastwood and Messrs. Dickerson, Evermann, Grinnell and Van Duzee.

ACCESSIONS TO THE MUSEUM

The accessions to the Museum during the year have been numerous, as set forth in the detailed list in the appendix to this report. Several important donations were received from exhibitors at the Panama-Pacific International Exposition, and many others from various and miscellaneous sources.

The Academy feels very grateful to all those who have in this way contributed to its collections.

RECOMMENDATIONS

Addition to the Museum Building.—Attention is again called to the necessity for additional room for the proper housing of

the Academy's collections and the proper display of exhibition materials already on hand or expected in the near future.

At the request of the President of the Board of Trustees the architect has submitted tentative plans and estimates for certain additions to the Museum building, as follows:

a. Closing in the Court in such a manner as to provide one floor for exhibits; estimated cost, $35,000; or
b. Closing in the Court in such a manner as to provide two floors for exhibits; estimated cost, $50,000; or
c. A main hall for the contemplated East wing; estimated cost, $90,000.

Any one of these plans would meet the present needs of the Museum fairly well.

Taxidermists' Laboratory.—The work of the Museum has been and is seriously handicapped because there is no suitable shop or laboratory in which the taxidermists and preparators can carry on their work. An item of $1500 was provided in the budget for 1916 for such a building, but it was found that this amount would not construct a building that would meet the approval of the Park Commissioners. The matter was therefore abandoned for the time being.

By using one of the habitat group cases not yet needed for exhibits and by constructing a small shed or room on the roof, we were able to get along for the time being. This arrangement is necessarily merely temporary. A suitable, commodious shop must be provided soon if the work is not to be seriously hampered.

Exhibits.—There remain five spaces for large habitat groups, —three in the Mammal hall and two in the Bird hall. Provisional plans have been made for installing in the three cases in the Mammal hall a Humboldt Elk group, a Southern Mule Deer group, and a Fur Seal group. Some of the animals required for the fur seal group have been secured through the kind co-operation of the United States Bureau of Fisheries, and it is expected the others will be obtained next fall. Efforts to secure animals for the Humboldt elk and the Southern Mule deer groups have as yet been unsuccessful, but it is hoped they may be secured next fall.

It is proposed to install in the two remaining large cases in the Bird hall a White Pelican group and a Game Bird group showing all the species of ducks, geese and other game birds that winter in the San Joaquin Valley. Mr. Paul J. Fair with an assistant is now at the Los Baños Gun Club in Merced County collecting the birds for this group. The birds for the White Pelican group will be gotten in the spring.

In the Mammal hall provision has been made for 22 small mammal groups to be placed at either end of the large groups. The Bird hall has spaces for 12 similar small bird groups, two of which have already been installed, leaving 10 to be supplied.

It is hoped that provision may be made for securing as rapidly as possible the mammals and birds required for these small groups, and that a number of such groups be completed within the year.

Research Collections.—Attention is again called to the necessity of giving greater encouragement to research work than has been possible during the last few years. The reputation and standing of the California Academy of Sciences as a scientific institution will always be determined by the scientific workers connected with it and the contributions they make to the literature of the physical and biological sciences. Field investigations and explorations and the building up of the Museum's collections must be encouraged and provided for; and specialists and facilities must be provided for the study of the rich collections which the Museum already possesses and those which it may secure.

APPENDIX TO THE DIRECTOR'S REPORT

LIST OF ACCESSIONS TO THE MUSEUM AND LIBRARY, 1916

Anderson, F. M., Berkeley, Cal.: Two turtle shells from Bolivar, Colombia, S. A.; and collections of Miocene, Eocene and Cretaceous fossils from near Coalinga, Cal. Gift.

Argentine Government, through Hon. Enrique M. Nelson, Vice-Commissioner General, Panama-Pacific International Exposition: Thirty-nine specimens of mounted Argentine birds; eight mounted specimens of native mammals; 10 boxes of exhibits of native insects; 10 framed colored drawings of Argentine plants; a stereoscope and 37 slides; an exhibit illustrating water filtration; specimens of ores; 300 books and pamphlets; and 145 specimens of Argentine plants. Gift.

Babcock, John P., Victoria, B. C.: Twenty-four sheets of botanical specimens from the West Coast of Vancouver Island, B. C. Gift.

Bacon, Gaston E., San Francisco: Specimen of sand dollar from the ocean beach. Gift.

Beardsley, Miss D. C., Pacific Grove, Cal.: One specimen of the whistling swan from Monterey, Cal.

Berry, S. Stillman, Redlands, Cal.: Seven pamphlets. Gift.

Blatchley, Hon. W. S., Indianapolis, Ind.: One copy of "Rhyncophora or Weevils of North Eastern America." Gift.

Brandt, W. M., Gualala, Cal.: Two obsidian arrowheads. Gift.

Branner, Dr. John C., Stanford University: Fifty-five bound volumes. Gift.

Brasil, Prof. L., University of Caen, Caen, France: One pamphlet. Gift.

California Botanical Club, through Miss Alice Eastwood: A collection of 397 specimens of Mexican plants collected by Dr. Edward Palmer in 1910, purchased for $39.80 by the Club. Gift.

California, University of, College of Agriculture, Berkeley, Cal: Fifty-five numbers of the Bulletin of the College of Agriculture, nearly completing the Academy's set. Gift.

Carlson, John I., California Academy of Sciences: One botanical specimen, exotic. Gift.

Chastain, James, California Academy of Sciences: Specimens of obsidian and pumice from Siskiyou County, Cal. Gift.

China, Government of, through the Commissioner-General, Panama-Pacific International Exposition: Two exhibit cases. Gift.

Clemens, Chaplain Joseph C., Fort Sill, Oklahoma: A collection of about 300 specimens of frogs, lizards, toads, and snakes from China and the Philippine Islands. Gift.

Clemens, Mrs. Joseph C., Fort Sill, Oklahoma: Five botanical specimens from Oklahoma. Gift.

Coleman, Mr. R. A., San Francisco: Collections of minerals and fossils from Alaska. Gift.

Cook, Melville T., New Jersey Agricultural Experiment Station, New Brunswick, N. J.: One pamphlet. Gift.

Coombs, Mrs. A. L., San Francisco: Ten specimens of plants from the Yosemite Valley. Gift.

Crocker, Hon. Wm. H., San Francisco: Three large folios—"Japanese Temples and Their Treasures." Gift.

Dickerson, Dr. Roy E., California Academy of Sciences: Ten collections of Martinez fossils from the Simi Hills; eight collections of fossils from the Marysville Buttes; seven collections from the vicinity of Petaluma; and specimens of foraminiferal shales from Casmalia and Lompoc, Cal. Exploration.

Dorne, Mrs. Nelly Waterhouse, San Francisco: One pamphlet. Gift.

Drake, C. J., Ohio State University, Columbus, Ohio: Representatives of five recently described Tingids (Hemiptera) from the east. Gift.

Durden, H. S., San Francisco: A map of California in which each county is represented by a piece of wood from some tree native and characteristic of the county, and a collection of fossils, mesozoic ammonoids, petrified wood from the auriferous gravels of California, and several fine specimens of California minerals. Gift.

Eastwood, Miss Alice, California Academy of Sciences: Collections of botanical specimens from Colorado as follows: Two hundred thirty-four specimens from Grand Junction, 63 from Telluride, 155 from Durango, 85 from Trinidad, and 191 from the vicinity of Denver; a collection of about 500 specimens from the Grand Canyon, Arizona; 85 specimens from Gallup, New Mexico; 20 specimens from Williams, and 12 from Seligman, Arizona; a collection including 60 species, chiefly exotics, from Santa Barbara; 160 specimens, representing 140 native species, and specimens of 45 exotics, from Ventura Co., Cal. Exploration. A folio of postcards, made by Henry Hemphill; and two salamanders from San Francisco. Gift.

English, W. A., U. S. Geological Survey, Washington, D. C.: A collection of Miocene and Pliocene fossils from west side San Joaquin Valley. Gift.

Evermann, Dr. Barton W., Director of the Museum, California Academy of Sciences: Two sheets of specimens of *Spraguea umbellata* and *Spiræa splendens* from Crater Lake, Cal.; nine specimens of plants collected in the mountains back of Nordhoff, Ventura County, Cal.; 14 specimens of Colorado plants; 27 botanical specimens from Cottonwood Springs, seven from Mecca, Cal., 24 from Newhall, Cal., and 25 from Saugus, Cal.; specimens of the Walking Fern (*Camptosorus rhizophyllus*), from Knoxville, Tenn., collected in 1893; 10 manganese nodules dredged by the U. S. Fish Commission Steamer "Albatross" in the South Pacific during the Agassiz-Albatross South Pacific Expedition of 1899-1900; a collection of garnets from St. George Island, Pribilof Group; fossil leaves, Chignik Bay, Alaska; and one snake from Firebaugh, Cal. Gift.

Field, C. F., San Diego, Cal.: Miocene or Pliocene fossils from Tia Juana Valley Oil Well. Gift.

Giffard, W. M., Honolulu, T. H.: Eleven paratypes of Hymenopters (5 species); and 126 California insects. Gift.

Gordon, W. A., Los Angeles, Cal.: Miocene fossils from vicinity of Quail Lake on Osos Creek, Cal. Gift.

Grant, Hon. J. D., San Francisco: One buffalo skull from Klamath River. Gift.

Grinnell, Fordyce, Pasadena, Cal.: Twenty sheets and five duplicates of botanical specimens from Pasadena; 20 botanical specimens from Mt. Wilson; and 316 insects from vicinage of Los Angeles. Gift.

Grove, Mrs. Jas., Camptonville, Cal.: One lizard from Yuba Co., Cal. Gift.

Hawaii, Government of, through Commissioner-General, Panama-Pacific International Exposition: Three fishes and five eels from Diamond Head, Oahu; and one turtle from Makapu, Oahu. Gift.

Henry, J. K., Vancouver, B. C.: Nine sheets of botanical specimens from Vancouver Island. Gift.

Heyer, Mrs. H. C., San Francisco: Sixty-one specimens of Alaskan birds, chiefly water birds. Gift.

Holm, Adolph, San Francisco: Three botanical specimens. Gift.

Hubbard, Samuel, Oakland, Cal.: Fourteen specimens of a species of fish (*Cyprinodon macularius*) from Saratoga Springs, Death Valley, San Bernardino Co., Cal. Gift.

Hunt, H. H.: One salamander from La Honda, Cal. Gift.

Kelly, James H., Tiburon, Cal.: Twenty-one numbers of the earlier publications of the Academy. Gift.

Klapp, Jesse R., San Francisco: A fine adult male specimen of the Western Goshawk (*Astur atricappilus striatulus*), from Golden Gate Park. Gift.

Kusche, August, Eldridge, Cal.: One hundred and twenty-seven sheets of Arctic plants from Alaska and the Yukon; 19 specimens of birds from Alaska; six mineralogical specimens from Ketchikan; and 52 specimens of Neuroptera from Alaska. Gift.

Logan, Hugh B., Baker, Ore., through Mr. John W. Mailliard, Sr., San Francisco: One skin of the Mountain Coyote (*Canis latrans lestes*), male, from North Powder, Baker Co., Ore., Feb. 10, 1916; and one skin of the Pallid Barred Wildcat (*Lynx fasciatus pallescens*), male, from Salisbury, Baker Co., Ore., Jan. 25, 1916, both collected by Mr. Logan. Gift.

Loomis, L. M., San Francisco: One bound copy, Ridgway, Birds North and Middle America, vol. 7. Gift.

Mailliard, Hon. John W., Sr., San Francisco: Two specimens of the California Condor (*Gymnogyps californianus*), collected in San Diego County, Cal., Jan. 1 and 3, 1894, by E. B. Towne; and one bound volume, "Egyptian Birds" by Charles Whymper. Gift.

Martin, Bruce, Berkeley, Cal.: A collection of 627 insects collected in Colombia, South America, 126 of these being butterflies in papers, and the balance mostly beetles. Gift.

McAllister, Otis and Miss Ethel, San Francisco: One wasp's nest. Gift.

McGuire, Ignatius, California Academy of Sciences: Three snakes from Golden Gate Park. Gift.

Meinecke, E. P., Washington, D. C.: Five pamphlets. Gift.

Menzies, R. M., San Francisco: One beetle (*Buprestis aurulenta*) from Marin Co., Cal. Gift.

Merriam, Dr. C. Hart, Washington, D. C.: A collection of 486 specimens of Atlantic coast mosses, comprising 65 genera and 181 species, all new to the herbarium; and a cross section of the largest tree of the California lilac, *Ceanothus thyrsiflorus,* measuring 14 inches in diameter, and two cross sections of other trees of the same species and one of *Rhamnus californica.* Gift.

Miller, Mr. Charles E.: Thirty-five sheets of botanical specimens from Santa Rosa and Santa Cruz islands. Gift.

Miller, Thomas L., San Francisco: One snake skin. Gift.

Mitchell, Henry S., San Francisco: Twelve bound volumes; two nautical charts; 36 packages of shells; four fossils from the Santa Cruz Mountains; and a sextant. Gift.

Moxley, George L.: Forty-one sheets of botanical specimens from Los Angeles, Cal. Gift.

Nelson, Mr., San Francisco: Pleistocene fossils from Nome, Alaska, one mile north of present beach, four miles east of Nome. Gift.

Oldroyd, T. C., Long Beach, Cal.: A collection of edible clams of California. Gift.

Pack, Herbert J., Salt Lake City, Utah: One vial of shrimps (*Artemia*) from Great Salt Lake. Gift.

Parker, Sir Gilbert, London: A collection of about 100 pamphlets, on the European War. Gift.

Reynolds, L. C., San Francisco: A collection of insects in alcohol, and 336 insects, mostly Hemiptera. Gift.

Rixford, Dr. Emmet, San Francisco: Specimens of *Trifolium Bolanderi* collected at type locality. Gift.

Rixford, G. P., San Francisco: Seventeen sheets of botanical specimens from Riverside. Gift.

Rosenbaum, L. S., San Francisco: A collection of 232 California insects. Gift.

Ryfkogel, S. D., San Francisco: Alaskan bow, arrows, and spear, and three wooden bowls. Gift.

Sargent, Prof. L. E., Cambridge, Mass.: A collection of 120 specimens of woody plants. Exchange.

Shirk, Joseph, Berkeley, Cal.: One horned toad (*Phrynosoma*) from Berkeley; and specimens of salamander eggs. Gift.

Slevin, Joseph R., California Academy of Sciences: Three snakes, 371 lizards and 47 toads from Pyramid Lake; one snake, nine lizards, and one frog from Carlin, and 10 snakes, two toads, and 12 frogs from Elko, Nevada; 13 snakes, 23 lizards, 137 frogs, and 15 toads from Boise; four snakes, 31 frogs, five toads, and two salamanders from Payette Lake; two snakes and 56 frogs from Gyer Hot Springs; four snakes, 42 lizards, and 46 frogs from Ft. Hall, Idaho; one snake from Portland, Oregon; two snakes, 165 lizards, from Thompson, and five salamanders and 127 frogs from Salt Lake City, Utah; one snake from Carmel, one from San Jose, one from Los Baños, five lizards from Stanford University, 17 snakes, four lizards and one toad from Golden Gate Park, and two mussel shells from the Humboldt River at Elko, Nevada. Exploration.

Smith, L. E., Sisson, Cal.: Skull of a small mammal, collected at Hilts, Siskiyou Co., Cal.; specimens of two rare species of plants from northern California, and 149 bound volumes. Gift.

Snodgrass, R. E., Washington, D. C.: Seventeen volumes and 38 pamphlets. Gift.

South Dakota, through Mr. Chas. McCaffree, Commissioner of Immigration: Specimen of iron ore. Gift.

Stonehouse, Miss Mabel E., Sisson, Cal.: Seven botanical specimens from Hilts, Siskiyou Co., Cal. Gift.

Stoner, R. G., San Francisco: A collection of Upper Miocene fossils from Topo Canyon, Cal. Gift.

Tough, F. B., Los Angeles, Cal.: Oil sands and buff-colored clay. Gift.

Troyer, Carlos, San Francisco: Pamphlet, "Indian Music," by himself. Gift.

United States Fisheries Steamer "Albatross": Twenty-one bird skins; specimens of fishes, sponges, molluscs, crustaceans, cœlenterates, amphibians, annelids, bryozoa, echinoderms, worm tubes, worms, hydroids, algæ, shells, coral, plants, brachipods, 15 insects, eight tree frogs from Cerros Island, two tree frogs and two toads, from Sweet Water Valley, San Diego Co., Cal., and one rattlesnake from Turtle Bay, Lower California. Gift.

United States National Museum, Washington, D. C.: Eighty-one specimens of cryptogams. Exchange.

Van Denburgh, Dr. John, California Academy of Sciences: One Rough-winged Swallow (*Stelgidopteryx serripinnis*) from Edenvale, Santa Clara Co., one snake and seven salamanders from Stanford University, one snake, Sausalito, three snakes from San Jose, one snake, one toad and 12 lizards from Imperial Co., two lizards and two snakes from Merced, Cal. Exploration.

Van Duzee, Edward P., California Academy of Sciences: Sixty-five specimens of insects from Los Baños; 338 specimens from Crystal Lakes, San Mateo Co.; 113 specimens from Mt. Diablo, Contra Costa Co.; 243 specimens from Niles; 87 specimens from San Francisco, 595 specimens from Lake Co., 490 specimens from San Diego, 36 specimens from Los Angeles, 124 insects from Leona Heights, Cal. Exploration. Sixteen pamphlets. Gift.

Van Dyke, Dr. E. C., Berkeley, Cal.: Eight hundred and thirty-four insects. Gift.

Varney, Mrs. F. N., San Francisco: One Short-eared owl. Gift.

Von Geldern, Otto, San Francisco: Seventy-six insects from Louisiana. Gift.

Waring, C. A., Berkeley, Cal.: Martinez fossils from the Simi Hills, Cal. Gift.

Witham, Henry, San Francisco: Four bound volumes. Gift.

Wickes, Miss E. M.: One botanical specimen from Santa Cruz, Cal. Gift.

Wooster, John, San Francisco: One hummingbird nest. Gift.

Wrasse, E., San Francisco: Specimen of oyster-shell. Gift.

Young, Carlos, San Francisco: Copper ores and mineral cabinet. Gift.

DEPARTMENTAL REPORTS

DEPARTMENT OF BOTANY

By Alice Eastwood, *Curator*

The new Herbarium now contains 32,281 mounted sheets, representing 10,241 species and 3223 genera of Phanerogams and the higher Cryptogams. Besides these there are also the types saved from the fire and the bundles of lupines and gilias which were loaned at the time and have since been returned, but which are not yet incorporated in the herbarium on account of lack of room. There are also the collections of mosses given by Dr. C. Hart Merriam numbering 486 specimens, and 81 specimens sent in exchange from the National Museum. A collection of Hawaiian ferns and a collection of 100 plants from the Alps donated by Mrs. Zelia Nuttall after the fire have been this year mounted and put in place and almost all have added species to the collection that were very desirable. The California Botanical Club has purchased two collections at a total expense of sixty dollars.

Duplicates have been sent to the following herbariums:

Stanford University	230
Gray Herbarium of Harvard University	353
The Arnold Arboretum	411
The U. S. National Herbarium	765

Other sets of duplicates are ready for distribution but have not yet been sent and there remains still a large collection of duplicates made chiefly by the curator to be distributed into sets when time can be taken from more pressing duties.

After ten years' delay, the collection of plants from the Galapagos Islands can now be labelled. The collector has at last sent the data necessary to enable the field numbers to be correlated with the published numbers. It is an immense job which would be impossible without the classifying into families, genera and species already done by the curator. Thousands of labels will have to be written, as there are many duplicates. Help will be absolutely necessary for that labor and it should be paid for by the Academy, for it is too laborious and uninteresting for members of the Botanical Club. It is hoped that the coming year will see this collection incorporated into the herbarium and the duplicates distributed to other herbariums so that exchanges can be secured.

Without the help of some members of the Botanical Club, the herbarium could not be in its present fine condition. Mrs. Marian L. Campbell has mounted 6,854 specimens, Mrs. G. Earle Kelly 300, while Mrs. C. L. Pitcher, Mrs. Ernest Meiere, Miss Kate L. Stoney and Miss Lena Gibbs have helped in other ways. With an allowance of one hundred dollars for help, the mounting alone would have exceeded the appropriation by more than fifty dollars if the lowest price for such work should have been paid. I have had the paid help of two school girls who could come on Saturdays and after school and they have helped me in writing labels and making an inventory of the herbarium.

The Botanical Club holds weekly meetings. These are conducted by the curator and take the form of popular talks and excursions in the park and the country. The Club is growing constantly without advertisement of any kind and has done much to make the California Academy of Sciences a popular institution. Besides this Club, the curator also conducts once a week an evening class of the young gardeners in the park who desire a scientific knowledge of the plants they cultivate. I have had to correctly name a great many species in the park, and sometimes it is very difficult as we have not the books most needed.

The exhibition of flowers from the park and the country kept up in the vestibule of the Museum has taken some time each week, but it fills a popular want. Each species is labelled with scientific name, common name, if one exists, and the native country.

It is hoped in the coming year to have the principal genera of shrubs in the park arranged in scientific sequence around the court of the Museum with labels giving not only the names and native countries, but also the families under which they are classified. If there is room I plan also a bed of the plants mentioned in the Bible and another of the plants mentioned in Shakespeare's writings. It may not be possible to obtain all, but whatever can be secured will be of interest and may lead to the final completeness.

During a six weeks' leave of absense on a trip to Colorado, the curator made large collections which will be classified elsewhere in the report. A trip was also made to Ventura and Santa Barbara in the spring and in August a trip to Southern California to attend the Pacific Coast Branch of the American Association meeting resulted in the collection of a great many exotics in Southern California.

Merriam, Dr. C. Hart, Washington, D. C.: A collection of 486 specimens of Atlantic Coast mosses, comprising 65 genera, 181 species. Gift. Also a cross section of a large tree of *Ceanothus thyrsiflorus* measuring 14 inches in diameter, and two cross sections of other trees of same species, also one of Rhamnus californica.

U. S. National Museum, Washington, D. C.: Eighty-one specimens of Cryptogams in exchange.

The California Botanical Club has purchased a collection of 385 specimens collected in California and Oregon by A. A. Heller in 1916, also a collection of 397 specimens collected in Mexico by the late Dr. Edward Palmer.

George L. Moxley has sent on 50 from the vicinity of Los Angeles for determination.

Fordyce Grinnell, Sr., has given 52 from the Sierra Madre mountains, to be named.

Miss Anna Junkans has sent 82 from Trinity County as a gift and for determination.

G. P. Rixford has contributed 37, chiefly exotics.

Mr. Charles E. Miller: Thirty-five sheets of specimens from Santa Rosa and Santa Cruz Island, also six from near Cisco.

Mrs. Ernest Meiere: Seven California species.
Dr. Barton W. Evermann: Ninety, chiefly from California.
Mrs. G. Earle Kelly: Thirty-four, chiefly from Monterey County.
Ida M. Blochman: One from Mariposa County.
Mrs. Arch M. Gilbert: Four from California.
Colin Eastwood Clegg: Sixteen from Scenic, Washington.
Mrs. Marian L. Campbell: One hundred sixty-five from high Sierras.
Mrs. Thos. Palache: One Torreya from Sierras.
Fred Koch: One rare anemone from California.
Arthur L. Bolton: Forty-five from parts of California and Arizona.
J. P. Babcock: Twenty-four from West Coast of Vancouver.
T. D. A. Cockerell: One hundred seventy-two, chiefly New Mexico.
J. K. Henry: Nine, Vancouver.
Dr. A. Lyle: One fern from Massachusetts.
J. Aug. Kusche: One hundred thirty from Yukon and Alaska.
Miss Julia McDonald: One hundred eighty-six from Fresno County.
William H. Suksdorf; Six duplicate types.
Argentine: One hundred forty-five.
Mrs. A. L. Coombs: One hundred thirty-six California and Oregon.
C. S. Sargent: One hundred twenty exchange from Arnold Arboretum.
Adolph Holm: Four exotics.
Miss E. M. Wikes: One.
Miss Mabel E. Stonehouse: Seven.
L. E. Smith: Two.
John Carlson: One.
The Curator: Two hundred seventy-five Grand Canyon, 587 exotics, 354 miscellaneous, 158 Ventura County, 162 Grand Junction, 117 Durango, 166 near Denver, 50 Trinidad, 50 Telluride, 33 Needles, 15 Seligman, 20 Williams, 64 Gallup.

DEPARTMENT OF HERPETOLOGY

By John Van Denburgh, *Curator*

Report of the Curator of the Department of Herpetology for the year 1916.

At the beginning of the year 1916 our collection of reptiles and amphibians numbered 32,280. There have been added during the year 1536 specimens, so that we now have 33,816.

The principal sources of the specimens received during the year have been as follows:

From California: Thirty-six snakes, 25 lizards, 10 salamanders, 4 toads, 2 frogs.
From Nevada: Fourteen snakes, 378 lizards, 48 toads, 13 frogs.
From Utah: Two snakes, 176 lizards, 5 salamanders, 127 frogs.
From Idaho: Twenty-three snakes, 64 lizards, 282 frogs, 5 toads, 2 salamanders.
From Oregon: One snake.

From Texas: Three salamanders.
From Mexico: One snake, 8 frogs.
From Colombia, S. A.: Two turtle shells.
From the Hawaiian Islands: One turtle.
From the Philippine Islands: Eight lizards, 9 frogs.
From China: Fifty-three turtles, 9 snakes, 52 lizards, 114 frogs, 59 toads.

During the year much progress has been made in classification and arrangement of the collection on the shelves. This work involves the separation, identification, rebottling, labeling and card-cataloguing of the entire collection of nearly 34,000 specimens. This huge task is now more than one-third completed.

Considerable scientific work also has been done during the year. Two short papers have been published, and two others presented for publication, while several others are in process of preparation. Among these are one on the reptiles of Nevada and one on those of Idaho.

During the coming year, it is hoped that the permanent installation of the collection may be still further advanced and the collection much increased in size. It long has been my desire to make the Academy's collection of reptiles and amphibians the largest and most valuable in America. The field is open to the Academy and there is no good reason why it should not avail itself of the opportunity to exceed all other museums in this line of research. The collection now is very large and ranks probably third in America, being exceeded by the collections of the United States National Museum and of Harvard University, each of which is perhaps fifty years older than our own. The growth of our collection during the years since the great fire has been phenomenal, but in the last five years, owing to lessened appropriations for field work, the rate of growth has been much reduced. The number of specimens added during each of the past six years has been, in round numbers, as follows:—

1911	6100	specimens
1912	3500	"
1913	2700	"
1914	800	"
1915	800	"
1916	1500	"

This is an average for the last four years of only 1450 specimens as against an average growth of over 4000 for each of the preceding seven years. The number received during the year 1911 was over 6100 specimens, but in 1914 and 1915 this was reduced to nearly 800. This reduction in the rate of growth is due to the reduction in the amount of money available for field work. The present rate of growth is quite inadequate to secure pre-eminence for our collection. If we are to do this the rate of growth must at least be restored to its former standard, and such restoration in the rate of growth means that there must again be made available larger sums of money to be devoted to this purpose. Now that the building in the Park has been completed, I hope that this may be done.

DEPARTMENT OF INVERTEBRATE ZOOLOGY

By Walter K. Fisher, *Curator*

Since the Department of Invertebrate Zoology is in a formative stage the work for the year has emphasized the accumulation of a collection.

Systematic collecting was conducted at three points along the California coast:

1. By the curator, at Monterey Bay and vicinity, during June.
2. By Mr. Carl Hubbs, in the region of Point Conception, during June.
3. By several members of the Department of Biology, University of Southern California, during a two-weeks' cruise of their dredging boat about Santa Catalina Island.

These have resulted in the accumulation of a considerable amount of material, which is being sorted.

In addition, the curator secured from Mr. W. F. Thompson of Stanford University a very valuable collection of west coast Gephyrean worms, as well as a miscellaneous collection of invertebrates taken in British Columbia and along the coast of California.

A small collection of Southern California echinoderms was donated by the University of Southern California.

A representative series of invertebrates was collected in the vicinity of Hilo, Hawaii, by Miss Leslie Tulloch, and after her untimely death was sent to the Academy by Miss Martha Tulloch.

Prof. Frank W. Weymouth, of Stanford University, has contributed a small lot of echinoderms and crustacea from Boundary Bay, B. C.

DEPARTMENT OF INVERTEBRATE PALEONTOLOGY

By Roy E. Dickerson, *Assistant Curator*

In accordance with your request of January, the assistant curator is pleased to report concerning the activities of the Department of Invertebrate Paleontology for the current year. With a small appropriation for field work this year, the department has been able to accomplish much very desirable exploration and investigations in three different portions of California. Laboratory studies on the Oligocene of Washington and California, the Miocene of the Mexican Gulf Coast, the Caribbean, Panama and Lower California, the Pleistocene and Pliocene of Sonoma County, the Martinez-Eocene of the Rock Creek Quadrangle in Southern California, the Eocene of Mexico have been completed or are in progress. Some exhibit material has been arranged and more is in course of preparation for exhibition in the Museum.

CARE OF COLLECTIONS

The paleontological collections are practically all numbered with locality number, and the types, cotypes and figured forms given catalogue numbers as well. The conchological collections are only partially numbered, but

the Hemphill conchological catalogue is almost completed. Approximately one-half of the Henry Hemphill conchological collection is unpacked, numbered and placed in drawer cases or exhibition cases. But little work has been attempted on the excellent collections of rocks and minerals obtained from the Exposition.

RESEARCH

During the first three weeks of June, the assistant curator investigated the Eocene and Cretaceous in the Simi Hills, which are 30 miles northwest of Los Angeles. Lower Eocene fossils of the Los Angeles basin exhibit the same peculiar facies as the Martinez fauna of the San Francisco basin. The abundance and variety of Turritellas, the Volutidæ, the Cypræidæ, and other tropical and semi-tropical forms, in comparison with the fauna of the San Francisco basin, are evidences yielded by these collections that apparently well-marked climatic zones existed during lower Eocene time, in marked contrast with the vague and indefinite climatic conditions of the Upper Eocene, Tejon, during which semi-tropical conditions existed far north of the Equator. Palms and other tropical or semi-tropical forms of the land flora occur in Washington while semi-tropical invertebrate shells are numerous in the Cowlitz phase of Washington.

Both the Rimella simplex zone or middle Tejon, and the Siphonalia sutterensis zone of the uppermost Tejon, were recognized in the vicinity of the Simi Hills. About five miles north of Chatsworth Pass, Mr. R. G. Stoner discovered an interesting locality which yielded numerous species characteristic of the uppermost Eocene of California, the Siphonalia sutterensis zone. This zone typically occurs in the Marysville Buttes, Sacramento Valley, and also extends along the western border of the Sierra Nevada, the marine equivalent of the land-laid auriferous gravels. This is the first recognition in California of the Siphonalia sutterensis zone in the outer Coast Ranges. Presumably, in most places in the coast ranges, the uppermost Eocene was removed during the interval of emergence between the Eocene and Oligocene on the Pacific Coast. About 15 new species from the Martinez-Eocene and about 12 forms new to science were found in the Tejon Eocene in this area.

The Marysville Buttes were visited in April by the assistant curator. Eight different collections were obtained from the uppermost Eocene of this region. Ten beautiful new species were found. Knoxville cretaceous fossils were discovered for the first time in this ancient volcano of the Sacramento Valley. The uppermost Cretaceous, Chico group, was discovered in four different localities and fair collections were obtained. No Horsetown or middle Cretaceous was found in this area; presumably an interval of erosion in this region represents Horsetown time, as these deposits occur in great thicknesses 30 miles west of the site of the Marysville Buttes, or faulting has uplifted the lower Cretaceous—the Knoxville—and lowered the upper Cretaceous, the Chico, and concealed the middle or Horsetown member of this Mesozoic period.

During three weeks in July, the assistant curator, aided by Mr. John B. Kerr, collected from seven different localities in the Merced formation,

between the ocean and Petaluma and northwest in the vicinity of Freestone. The type locality of the Merced, a Pliocene formation, is located in a cliff section 3½ miles north of Mussel rock, where about 5000 feet of sands and shales are exposed. These collections demonstrate the presence of Merced strata resting unconformably upon an old erosion surface cut in ancient Franciscan rock of probable Jurassic age. Sonoma tuff, a volcanic ash and pumice deposit, was found interbedded with Merced strata in the vicinity of Freestone and environs. This tuff occurs in very extensive deposits east of Napa, and occurs at the base of the Orindan formation near Pinole. The Orindan formation which consists of lake deposits, landlaid deposits, and interbedded volcanics is an extensive formation of the Berkeley Hills. Probably it is the equivalent of the marine Merced. This correlation is further reinforced by the discovery that the Lawlor ranch beds of Sonoma Mountain, which consist of sands, gravels and clays of an intervolcanic period rest upon andesite and Sonoma tuff. These beds have yielded *Neohipparion gidleyi* Merriam. Neo-Hipparion also occurs in the Orindan strata, and the Etchegoin of the western border of the lower San Joaquin Valley.

Three collections from an ancient lake deposit east of Petaluma were obtained. Apparently a portion of the Petaluma lake beds represents a period of time somewhat younger than any of the marine Miocene of San Pablo age, as brackish water fossils were found in two localities. These fossils are identical with forms which occur in a similar deposit in the upper portion of the San Pablo formation of the Carquinez Straits vicinity, a marine formation about 2000 feet thick. Here we have apparently a transition from marine to brackish water and finally to fresh water conditions in this Miocene basin.

In summary then:

The region lying between Tomales Bay and the top of Sonoma Mountain is a block which has been but little disturbed by folding or faulting since the Pliocene. This wave-cut block has, however, been warped so that it tilts from the sea towards Sonoma and Petaluma valleys, is uplifted near Freestone on the northwest to 1100 feet, but is only 500 feet in elevation 20 miles south on the shore of Tomales Bay.

The formations involved are in order, the Franciscan group, Petaluma lake beds of upper Miocene age, Marine Merced Pliocene, Basalts, Andesites, interbedded tuffs and sandstones of inter-volcanic period of the Sonoma Mountain region, stream terraces and marine terraces of Pleistocene age.

Marine Miocene may exist beneath Sonoma Mountain, as is indicated by oil sands and oil impregnated basalts at one locality east of Petaluma.

Sonoma tuff is interbedded with the Merced formation at Freestone.

The Merced formation is the correlative in a broad way of the Sonoma tuff, the Pinole tuff, the Orindan, and probably the upper portion of the Etchegoin-Jacalitos of the San Joaquin Valley.

The Hayward fault on the west side of Sonoma Mountain exhibits many characters which are due to recent movements which produced earthquakes during recent historic time.

At the invitation of Dr. L. F. Noble of the U. S. Geological Survey, the assistant curator spent two weeks last December in an area on the southern border of the Mojave Desert, the north flanks of the San Gabriel Mountains. This region is in a zone of great faults. Here we find blocks of Tertiary sediments dropped in between great breaks in the earth's crust. In these sediments both marine and land forms were found imbedded. From these fossils and stratigraphy as bases, the historical geology of this region is being worked out. Some relations of the land laid deposits of the Great Basin region with the marine of the Pacific Coast and Gulf of California are being solved in this field. The nature of recent faulting and its resultant topographic forms are wonderfully exemplified in this field. The results of this work will be published in collaboration with Dr. Noble, as a Professional Paper of the U. S. Geological Survey.

PUBLICATIONS

Dr. C. E. Weaver published three papers in the Academy Proceedings during the current year:—Eocene of Lower Cowlitz River Valley, Washington; The Post-Eocene Formations of Western Washington; and The Oligocene of Kitsap County, Washington. The Stratigraphy and Fauna of the Tejon Eocene of California was published by the assistant curator in the University of California Publications. A paper entitled The Stratigraphic and Faunal Relations of the Martinez Formation to the Chico and Tejon of Southern California, by Mr. C. A. Waring and The Fauna of the San Fernando Formation of Northeastern Mexico by R. E. Dickerson and W. S. W. Kew have been accepted for publication. Papers entitled: Geology of a Portion of the McKittrick District, by Mr. G. C. Gester, Ancient Panama Canals, Climatic Zones of Martinez-Eocene Time, Climatic Conditions During the Oligocene with Descriptions of New Species from the Oligocene of Washington, by R. E. Dickerson, have been submitted to the committee on publication. A paper on the Geologic History of the Marysville Buttes is in course of preparation by the assistant curator.

EXHIBITS

The Standard Oil Company has installed an oil exhibit in the east wing of the building and is now adding to, and improving it. Two cases of fossils representative of the oil bearing rocks are installed in connection with this valuable exhibit.

A portion of the Henry Hemphill conchological collection showing variation is on exhibition in the main Museum hall. Typical shells from this collection are being arranged in the reference room.

Fossil freshwater fishes from an Eocene lake in Wyoming, a collection of rocks and minerals from Washington, and a collection of the edible clams of California are also displayed in the main hall.

DONATIONS

During the year many donations of valuable specimens have been received by the Museum, which have been added to the research collections of this department, as set forth in detail in the Director's report.

LIBRARIAN'S REPORT

By Edward P. Van Duzee, *Assistant Librarian*

Please allow me as assistant librarian to submit the following report on the work done in this department during the past fiscal year, together with a few suggestions for the coming year.

My connection with the library began on June first, 1916. I then found that after the removal of the library to the new Academy building the books had been placed on the shelves. The periodicals, the publications of societies and the administrative and scientific reports of the Federal and of the state governments, had been segregated and arranged in proper order, but only partially collated. Some of the more important individual books had been sorted out and arranged on the shelves in the reading room and a start had been made toward classifying them after the Library of Congress system. After correspondence with neighboring libraries and consultation with yourself and the members of the Academy staff it was finally decided to follow the majority of similar institutions and adopt the Decimal Classification as the one best suited to our needs. The first work done was the classification and arrangement of the miscellaneous books in the main library. The books so treated numbered 2650 volumes. Author and subject cards for these were written by Mr. Ignatius McGuire, and Mr. John Carleson engrossed the call number upon the back of each book and on each card. The sets of periodicals and publications of learned societies have also been classified and the cards for them made and engrossed, and those in the English language and a considerable part of those in foreign languages have been collated. The catalogue cards have been alphabeted in two series, one including the author and title cards, the other the subject cards, so there is now a fairly useful catalogue of the books in the main library but including very few analyticals. Current accessions to the library are entered and acknowledged as soon as possible after their receipt. An accession register has been started but is not yet nearly complete. Mr. McGuire has made the entries in this register, which now number 5401.

The most important work in this department for the coming year will be the classification and cataloguing of the state and Federal government publications in the main library and of the books in the laboratories of the departments of Botany, Ornithology and Paleontology, the books pertaining to the other departments having been mostly attended to in connection with the work on the main library. The preparation of a card shelf-list and the completion of the accessioning are other important matters to claim attention during the coming year.

I would like to suggest the desirability of having a moderate appropriation in this department, of perhaps $100, in the next fiscal year for the purchase of Library of Congress and American Library Association analytical catalogue cards for certain important sets of serial publications, a smaller sum for the construction of a wall case in the reading room suitable for the shelving of current serials and new accessions, and not less than $200 for the binding of a few important books and serial sets. The

binding of serial publications in a scientific library is always an important and considerable item in the fixed charges of the institution and it is rarely advisable to postpone such expenditures too long or the binding of the accumulated volumes may become a serious problem.

DEPARTMENT OF ENTOMOLOGY

By Edward P. Van Duzee, *Curator*

I beg to submit the following report on the condition and work in the Department of Entomology for the current fiscal year, including a few suggestions for the ensuing year.

My appointment as curator of this department took effect on June first, 1916, and on assuming the duties of the position I found the collections of the department unorganized and unarranged, although well cared for and in excellent condition. The first work done was the fumigation of the laboratory with hydrocyanic acid gas to kill museum pests introduced into the room with the Galapagos tortoises that had been temporarily stored there. Suitable book shelving was then erected, the books pertaining to the department were brought in from the main library, and the scientific apparatus and property of the department was unpacked and made available for use.

The collection of insects was found to be in almost perfect condition with practically no infestation by museum pests. There were about 200 trays well filled with mounted specimens and about 60 trays filled with unmounted material in boxes and papers. A portion of the mounted material had been properly labelled for locality and collector, but the larger part was without such labels. It has been my first duty to get this material labelled so it can be made available for study and exhibition. Many thousands of these labels have been printed and attached to the specimens and this work is now nearing completion, so the arrangement and classification of the collection can soon be begun.

During the year 4859 specimens have been added to this department by gift or through collections made by myself, and these have all been mounted and properly labelled. Very little field work was done during the year. I spent one day at Los Baños, two at or near Mt. Diablo and three in Lake County. On the last two trips I went as the guest of Mr. W. M. Giffard, so the total expense to the department for all trips was but $6.75. I also spent two days collecting about San Diego, a few hours at Manhattan Beach, Los Angeles, and took several Sunday trips about the Bay district without expense to the department. The total accessions from these collecting trips number 1976 specimens.

During the year two collections have been sent to specialists for study. The Orthoptera of the Galapagos Expedition were sent to Messrs. Hebard and Rehm and the Plusiini to Dr. Ottolengui.

A portion of my time during the past year was devoted to the study and determination of insects for correspondents of the Academy and to the publication of a bibliographical and synonymic Catalogue of the Hemiptera

of America north of Mexico. This catalogue will soon be issued as a volume of the semicentennial publications of the University of California.

A collection of butterflies for temporary exhibition in the Mammal Hall of the Academy was prepared soon after the formal opening of the Academy building. This collection consists of 12 trays of showy exotic species and six trays of carefully determined and labelled California species which it is hoped may be of interest to children taking nature work in the public schools and to those beginning a collection of local insects and wishing help in the determination of their captures.

Looking ahead to another year the most urgent duty of the curator of this department will be the classification and arrangement of the North American material now in the collection so it will be available for scientific research. Of scarcely less importance is the accumulation of a more complete collection of the insects of California as a basis for the ecological and taxonomic study of our insect fauna. Another matter of importance in outlining the work of the coming year is the inauguration of a system of recording the material in the collection and for this purpose a card system of species-records and a book record for current lots as received and for type material seems the most practical and useful. The preparation of a permanent exhibit, especially of the insects of our own State, should not be neglected, and later when our material has been worked over and made more available the preparation of life history groups can be undertaken to good advantage. For the preparation of these exhibits and for the mounting and labelling of the accumulated material now on hand, some provision should be made in the estimates for the coming year that will allow the employment of an assistant to the curator occasionally as circumstances may require. I might add that much of this accumulated material is of great scientific interest and is indispensable for study, but in its present condition it is entirely unavailable for such purposes and practically inaccessible, and it is important that it be mounted and suitable cases provided for its reception. Much of the work of this department in the past has been the accumulation of material, but it now seems desirable that this material be made available to our own students and to other specialists who may wish to undertake its study so the Academy may profit by their labors and acquire the types and paratypes of the new species.

FINANCIAL STATEMENTS

REPORT OF THE TREASURER

for the fiscal year ending March 31, 1917:

April 1, 1916, Cash Balance		$ 129.38
Receipts		
Dues	$ 1,539.75	
Chas. Crocker Scientific Fund Endowment Income	1,065.74	
James Lick Endowment Income	42,890.81	
General Income Account	20,165.03	
John W. Hendrie Income	607.50	
Bills Payable	631,300.00	
W. B. Bourn Donation	1,014.02	
Jos. D. Grant Donation	832.78	
Herbert Fleishhacker Donation	1,000.00	
J. S. Tobin Donation	250.00	
W. G. Wright Fund	38.50	
California Elk Expense	125.00	
Museum Appro. No. 32 Exhibits	1,077.86	
Museum Appro. No. 6 Botany	.45	
Museum	17.75	
Publication	10.21	
Appro. No. 10 Publication	66.20	
Appro. No. 40 Library	10.00	
Appro. No. 41 Desert Bird Group	18.00	
Post Card Sales	66.74	
Sundry Accounts	9.55	
		702,105.89
Carried forward		$702,235.27

REPORT OF THE TREASURER—*Continued*

Receipts		
Brought forward,—total receipts		$702,235.27
Expenditures		
Expense	$ 1,951.36	
Expense, Attorney's Fees	1,500.00	
General Salary Expense	11,710.00	
Bills Payable	634,100.00	
Insurance	1,266.35	
Interest	21,671.97	
Museum $ 108.95		
Museum, Department Appro 11,851.12		
Museum, Depart. Appro., Salaries 10,715.76		
	22,675.83	
Desert Bird Group	340.23	
San Joaquin Valley Game Bird Group	537.02	
San Joaquin Valley Bird Group	473.08	
Library	721.36	
Publication	1,592.69	
Museum Construction	4,006.00	
California Elk Expense	72.60	
Office Furniture	93.45	
Tools and Equipment	341.45	
Post Cards Purchased	79.30	
Sundry Creditors	38.52	
Sundry Advances (Museum)	780.00	
Contingent Fund	276.25	
		$704,227.46
March 31, 1917, Balance Due Crocker National Bank		$ 1,992.19

RUDOLPH J. TAUSSIG, *Treasurer.*

Examined and found correct.
McLAREN, GOODE & Co., *Auditors.*
San Francisco, Cal., April 18, 1917.

INCOME AND OPERATING EXPENSES

from April 1, 1916, to March 31, 1917:

Income		
Chas. Crocker Scientific Fund Endowment Income	$ 1,065.74	
James Lick Endowment Income	42,890.81	
General Income Account	20,165.03	
Dues	1,639.75	
		$65,761.33
Expense		
Salaries	22,425.76	
Expense, General $1,063.58		
Fuel 333.11		
Electricity 176.75		
Telephone 306.00		
Postage 159.58		
Stationery and Printing 244.99		
	2,284.01	
Legal Expense	1,370.00	
Insurance	1,266.35	
Interest	21,671.97	
		49,018.09
Surplus for year 1916-17		16,743.24

BALANCE SHEET

March 31, 1917.

Assets

Real Estate—		
Market Street Lot	$600,000.00	
Jessie Street Lot	8,083.65	
Commercial Building	516,818.66	
		$1,124,902.31
Stocks—		
45 Shares, Savings Union Bank and Trust Co.		10,000.00
Museum Construction		187,855.28
Museum—		
General Collections	52,583.61	
Exploration	12,906.50	
Tools and Equipment	11,314.44	
Wm. H. Crocker Donation—		
Farallon Islands Bird Group	2,318.73	
W. B. Bourn Donation—		
Desert Bird Group	2,659.31	
J. D. Grant Donation—		
San Joaquin Valley Bird Group	2,610.42	
Herbert Fleishhacker Donation—		
San Joaquin Valley Game Bird Group, in process of installation	885.55	
		85,278.56
Library—		
Books and Equipment	14,420.74	
Publication	10,987.89	
		25,408.63
Office Furniture		2,543.84
Sundry Advances		16.55
		$1,436,005.17

Liabilities

Endowments—		
James Lick Endowment	$804,902.31	
Chas. Crocker Scientific Fund Endowment	20,000.00	
John W. Hendrie Endowment	10,000.00	
		$ 834,902.31
John W. Hendrie Endowment Income Account		8,677.50
Alvord Bequest, Botanical		5,000.00
Herbert Fleishhacker Donation		1,000.00
W. G. Wright Fund		123.70
Bills Payable		331,275.00
Sundry Creditors		311.28
Cash—		
Overdraft with Crocker National Bank	1,992.19	
Less Cash in Safe	63.63	
		1,928.56
Surplus		252,786.82
		$1,436.005.17

AUDITORS' CERTIFICATE

We have examined the foregoing Balance Sheet, together with the books and accounts of the CALIFORNIA ACADEMY OF SCIENCES, and in our opinion it is properly drawn up so as to exhibit a true and correct view of the Academy's affairs, as shown by the books.

McLAREN, GOODE & Co.,

San Francisco, Cal., April 17, 1917. *Certified Public Accountants.*

EXPLANATION, PLATE 3

SAN JOAQUIN VALLEY ELK

(*Cervus nannodes*)

This elk, which is restricted to California, formerly ranged in great numbers over the Sacramento and San Joaquin Valleys, and westward through the Cuyama Valley into Santa Barbara County and through Santa Clara County to the coast at Monterey.

As a result of persistent persecution the great herds became reduced almost to extermination. A small band, the last of their race, took refuge on the ranch of Messrs. Miller and Lux, cattlemen, in Kern County. By the order of Mr. Henry Miller this band was rigidly protected and permitted to increase until now it numbers more than 400 head.

Recently the California Academy of Sciences, with the co-operation of Messrs. Miller and Lux and the California Fish and Game Commission, caught and distributed about 150 of these elk to various large public reservations in California. The results are very encouraging and it is believed a number of new herds will become established.

At certain seasons these elk resort to the great tule swamps; hence the name "Tule Elk," sometimes used to distinguish this species from the larger elk which inhabits the more humid coast belt north of San Francisco.

The animals in this group were obtained in Kern County, Cal.
Group prepared under the direction of John Rowley.
Background painted by Charles Abel Corwin.
Photo by Gabriel Moulin.

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Group prepared under the direction of John Rowley.
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EXPLANATION, PLATE 4

COLUMBIAN BLACK-TAILED DEER

(*Odocoileus columbarius*)

This group represents a summer scene in Mendocino County, California, where the deer shown were taken. At this season the deer assume what is known as the "red coat," which is gradually shed, changing to the bluish coat. The hair then becomes grayer in color as it lengthens for the winter months. In the spring the long hairs of the winter coat are shed and again replaced by the short red coat of summer.

The horns are shed annually, usually in February and March. The entire antler drops off from the skull at the base of the horn or "burr." A new horn sprouts out from the skull and, normally, develops into the antler characteristic of the species. During the process of development the horn is covered with skin and hair, as shown on the males of this group. This hairy covering is known as the "velvet." When the horn has reached its maximum growth it gradually hardens, then the animal rubs the antlers against trees and bushes and wears away the velvet covering, leaving the horns hard and polished.

The common belief that a deer develops a new point on the antlers each year and that the number of points indicates the age of the animal is erroneous.

Group prepared under the immediate direction of John Rowley.
Background by Charles Abel Corwin.
Photo by Gabriel Moulin.

EXPLANATION, PLATE 5

ROCKY MOUNTAIN MULE DEER

(*Odocoileus hemionus*)

This splendid deer is of wide distribution. In California it is found in the Sierras from Kern County northward, coming to the coast in the northern counties. The animals here shown were taken in Siskiyou County in October.

This is the largest of the North American deer, the adult males in prime condition weighing nearly 400 pounds.

The name "Mule Deer" is sometimes applied to this species because of its long ears and its mule-like tail.

Group prepared under the direction of John Rowley.
Background painted by Charles Abel Corwin.
Photo by Gabriel Moulin.

EXPLANATION, PLATE 6

ANTELOPE

(*Antilocapra americana*)

The Antelope or Pronghorn formerly ranged in immense numbers over the plains and valleys of North America west of the Mississippi River from Mexico to Canada. In California great herds were found throughout the Sacramento and San Joaquin Valleys and in other valleys to the north, east and south. As a result of persistent persecution and slaughter for their hides and meat, these animals have, in most parts of their range, been entirely exterminated. In southeastern Oregon and northwestern Nevada they are still common. In California small isolated bands are still left. In all these States they are protected by law.

The Antelope is the only member of the hollow-horned animals which annually sheds its horns. Only the outer shell or sheath, however, is shed, and not the entire horn, as in the deer and elk.

The Antelope is also unique in not possessing dew claws or accessory hoofs on the backs of the feet, as in the deer.

Group prepared under the direction of John Rowley.
The background was painted by Charles Abel Corwin.
Photo by Gabriel Moulin.

EXPLANATION, PLATE 7

DESERT MOUNTAIN SHEEP

(*Ovis nelsoni*)

This species of mountain sheep or bighorn is found in the desert mountains of southern California and adjacent parts of Nevada, Arizona and Mexico. The animals in this group were taken in December, 1913, in the San Jacinto Mountains, Riverside County, California.

The slender horns of the females have given rise to the mistaken belief that the Ibex—an animal found only in Europe and Asia—is found in America.

The story that mountain sheep sometimes jump from high precipices and alight on their horns is entirely erroneous, and is on a par with the hoopsnake, sea serpent and other similar stories.

In the desert mountains water is usually scarce, and the mountain sheep frequently eat the barrel cactus, the pulpy interior of which contains a large percentage of water; and this no doubt enables the sheep to go for long periods without drinking.

This group was prepared under the immediate direction of John Rowley. The background was painted by Charles Abel Corwin.
Photo by Gabriel Moulin.

EXPLANATION, PLATE 8

MOUNTAIN LION

(*Felis oregonensis*)

The Mountain Lion, in its various forms, is found from Patagonia to Canada, and from the Atlantic to the Pacific. In different parts of its range it is known by different names, as Panther, "Painter," Cougar, etc.

Although not so common as formerly, it is still plentiful in certain sections of California, especially in the northern part of the State. The animals in this group were taken in Humboldt County. The Mountain Lion is the largest of the North American cats. It is very destructive to deer and certain domestic animals, particularly colts and sheep. It has been estimated that each lion in California kills on an average one deer a week throughout the year. So destructive is it that the State pays a bounty of $20.00 each for its capture. Up to June 30, 1916, the State had paid bounties on 2,534 lions.

Although the Mountain Lion is looked upon as a very fierce animal and more or less of a menace to human beings, it is really a very wary animal, and instances of its attacking man are rare indeed. It is generally easy to tree, even with a cur dog, and chasing it with dogs is the method usually employed in its capture.

Group prepared under the direction of John Rowley.
Photo by Gabriel Moulin.

EXPLANATION, PLATE 9

NORTHWESTERN BLACK BEAR

(*Ursus americanus altifrontalis*)

The Black Bear in its various forms ranges generally from the Atlantic to the Pacific and from northern Mexico to Alaska. The specimens in this group were taken in Humboldt County, California.

In California, as elsewhere, the Black Bear may be either black or brown. In some instances both black and brown cubs are found in the same litter, and with either a black or a brown mother. Brown bears are sometimes confused with the Grizzly, which is now believed to be extinct in California.

Black bears occasionally kill sheep and pigs, but they live chiefly on nuts, roots and berries. Grubs, worms and insects also enter largely into their menu.

As a rule the Black Bear is a wary animal and will rarely or never attack a man unless wounded or cornered.

From one to four cubs (usually one or two) are produced in a litter. The cubs are usually born in January (in California) and are helpless little creatures; their eyes, like those of puppies and kittens, are closed and do not open for some time. They have no teeth and are almost naked. Although the mother bear may weigh three or four hundred pounds, the whole litter of cubs will weigh less than a pound. The cubs shown in this group were about two months old when taken.

Group prepared under the direction of John Rowley.
Photo by Gabriel Moulin.

EXPLANATION, PLATE 10

LEOPARD SEAL

(*Phoca richardi geronimensis*)

These interesting seals are fairly common in many places along the California coast, particularly in the bays. Unlike the fur seals which are highly polygamous, the harbor seals are monogamous. On the California coast the young are born in April and May; one pup is the rule. These seals are not migratory, nor are they as gregarious as other seals. They are comparatively silent, not making a loud roaring or barking as sea lions do. They are fond of basking in the sun, especially at low tide. On the land they are clumsy creatures. They move by pulling themselves forward by their foreflippers; in swimming the hind flippers do most of the work. The rookery here shown is at Cypress Point, near Pacific Grove, California, where the animals were obtained.

Group prepared under the direction of John Rowley.
The background was painted by Charles Bradford Hudson.
Photo by Gabriel Moulin.

EXPLANATION, PLATE 11

CALIFORNIA SEA LION

(*Zalophus californianus*)

This sea lion occurs on the sea coast and islands of California from San Francisco southward, breeding in many places, particularly on the Santa Barbara Islands. The rookery here shown is on Santa Cruz Island.

Owing to their intelligence and small size this is the species of sea lion that is commonly trained and shown in zoological gardens and elsewhere. The males are darker in color than the females, and are sometimes called black sea lions. Another characteristic of the male of this species is the great development of the bony crest on the top of the skull.

In early days sea lions were killed by thousands on the California coast for their hides and oil, but they have now become so reduced in numbers that sealing is no longer profitable. Sea lions as well as leopard seals are now protected on the California coast both by the State and Federal Governments. Among sealers the males are called "bulls," the females "cows," and the young "pups." The breeding season is from June to August, only during which time the males are found on the rookeries; at other times they go off in bands or singly living their lonely life.

Group prepared under the direction of John Rowley.
Background painted by Worth Ryder.
Photo by Gabriel Moulin.

EXPLANATION, PLATE 12

STELLER'S SEA LION

(*Eumetopias stelleri*)

This magnificent animal ranges from the Santa Barbara Islands northward into Bering Sea. Formerly very abundant, persistent killing for its hides and oil has reduced its numbers greatly. Within the last few years they have entirely ceased breeding on the famous Seal Rocks near the Cliff House at the Golden Gate. A few individuals still resort to these rocks, but they no longer breed there.

These animals reach a large size. The adult bull shown in the group weighed 1,810 pounds. There is a great difference in size between the sexes, the females being not more than half as large as the males.

Fishermen almost without exception claim that the sea lions are very destructive to the commercial fisheries. This is probably true at certain seasons and in some localities, but investigations have not fully sustained the charge.

The breeding season of this species on the California coast is the latter half of June. One young is produced at a birth.

The noise made by the Steller Sea Lion is a loud roar, resembling that of a real lion; this, together with the long yellowish hair of the necks of the bulls, doubtless suggested the name sea lion.

This group shows the breeding rookeries on Año Nuevo Island just south of San Francisco.

Group prepared under the immediate direction of John Rowley.
Background painted by Charles Abel Corwin.
Photo by Gabriel Moulin.

EXPLANATION, PLATE 13

CALIFORNIA RACCOON AND STRIPED SKUNK

(Procyon psora and Mephitis occidentalis)

This Raccoon is found throughout most parts of California, it being especially abundant in the heavily timbered country along the coast.

The Coon breeds in hollow trees, in holes in the rocks, in blind ditches, and even on the ground in tule swamps.

Coons are omnivorous; they eat shellfish, frogs, fish, and corn; they sometimes enter hen houses and kill and devour chickens.

In the South the negroes are very fond of the Raccoon, regarding its flesh as a delicacy. The Raccoon ranks third in value among the fur bearers of California.

The species of skunk shown in this group occurs throughout northern California except in the warmer interior valleys from Monterey northward.

The skunk brings forth its young in holes in the ground, beneath buildings, in stone piles or in hollow logs. They feed largely on insects, but will eat flesh of any kind, including chickens.

As a fur bearer the skunk is among the most valuable in the United States. In some States skunk farming has become a profitable industry.

Group prepared under the direction of John Rowley.
Photo by Gabriel Moulin.

EXPLANATION, PLATE 14

COYOTE

(*Canis ochropus*)

The Coyote, in its various forms, ranges throughout the United States west of the Mississippi and from Mexico to Canada. In California four species or subspecies are recognized. The one shown here occurs west of the high Sierras and south to the Mexican line. It is still only too abundant in many places. The family shown in this group was obtained in Moraga Valley near Mount Diablo, which is shown in the background.

The Coyote is very destructive to sheep, young pigs and poultry. Because of its great sagacity and nocturnal predatory habits, it has always been a great nuisance to the stock and poultry raiser. Because of this and its destructiveness to the smaller wild animals, especially birds, a bounty is paid for its capture in many counties of California.

In the colder parts of its range the Coyote develops a good coat of fur and the pelts have a fair commercial value.

Group prepared under the direction of John Rowley.
Background painted by Maurice G. Logan.
Photo by Gabriel Moulin.

EXPLANATION, PLATE 15

FARALLON ISLANDS BIRD ROOKERY

In this group, presented to the California Academy of Sciences by Hon. Wm. H. Crocker, are shown the ten species of sea birds and the one land bird (the little rock wren) that breed on the Farallon Islands. These rocky islands are about thirty miles off the Golden Gate, from which they may be seen on any clear day. Thousands of sea birds resort to these cliffs to lay their eggs and rear their young, one of the most common species being the Western Gull, which, during the rest of the year, is very abundant about San Francisco, following the ferry boats across the bay.

Until a few years ago thousands of Murre's eggs were brought each year from these rookeries and sold in San Francisco to the bakeries and pastry shops. The islands are now a Federal reservation and the birds and their eggs are rigidly protected.

The species of birds shown in this group are the following: Tufted Puffin, Brandt's Cormorant, Baird's Cormorant, Farallon Cormorant, Pigeon Guillemot, Western Gull, California Murre, Ashy Petrel, Kæding's Petrel, Cassin's Auklet, and Rock Wren, the last being the only land bird that breeds on these islands.

Group prepared under the direction of Paul J. Fair.
Background painted by Maurice G. Logan.
Photo by Gabriel Moulin.

EXPLANATION, PLATE 16

SAN JOAQUIN VALLEY BIRD GROUP

In the spring and early summer it is the practice of the cattlemen of the San Joaquin Valley to flood their land with water, to a depth of six to eighteen inches, to induce a ranker growth of grass for pasture. Many thousand acres are thus flooded and converted into marsh land, to which vast numbers of ducks, waders and other swamp-loving birds are attracted. During the breeding season great numbers of birds resort there to build their nests, lay their eggs, and rear their young. These breeding grounds are frequented by more than thirty species of birds. Among those shown in this group, which shows a typical breeding ground near Los Baños, Merced County, California, are the Fulvous Tree Duck, Cinnamon Teal, Shoveler, Redhead Duck, Coot, American Bittern, Least Bittern, Glossy Ibis, Avocet, Black-necked Stilt, Killdeer, Red-winged Blackbird, Yellow-headed Blackbird, Tule Wren, Little Black Tern, Forster's Tern, and the Virginia Rail. In order to show in a limited area a considerable number of species it was necessary to bunch the birds a little more closely than they actually occur in nature.

Presented to the Museum of the California Academy of Sciences by Hon. Joseph D. Grant.

This group was prepared under the immediate direction of Paul J. Fair.

The background was painted by Maurice G. Logan.

Photo by Gabriel Moulin.

EXPLANATION, PLATE 17

DESERT BIRD GROUP

In this group, presented to the California Academy of Sciences by Hon. Wm. B. Bourn, are shown, under natural surroundings, several species of the birds that nest in the Colorado and Mohave deserts of southern California. The particular locality represented is near Cottonwood Springs, 26 miles northeast of Mecca, Riverside County, California.

The spring rains transform the desert into a veritable flower garden, and many and varied forms of vegetation send forth an astonishing amount of beautiful bloom. Then is the nesting time of the birds, which are there in surprising numbers, some of them, as the Hooded Oriole and the Vermilion Flycatcher, rivaling the flowers in brilliancy of coloration.

The total number of species of birds nesting in this part of the Colorado desert is more than a score, and some species, as Gambel's Quail, are very abundant. The nests, however, are usually widely scattered except in the vicinity of water.

The following species of birds are shown in this group: Phainopepla, Costa's Hummingbird, Mourning Dove, White-rumped Shrike, Plumbeous Gnatcatcher, Lincoln Sparrow, Western Mockingbird, Texas Woodpecker, Desert Sparrowhawk, Vermilion Flycatcher, Bullock's Oriole, Arizona Hooded Oriole, Roadrunner, Cactus Wren, House Finch, Texas Nighthawk, Gambel's Quail, Desert Sparrow, Leconte's Thrasher, Arkansas Kingbird, Verdin and Abert's Towhee. The principal plants shown are: The Palo Verde, Spanish Bayonet, Deerhorn Cactus, Prickly Pear Cactus, Barrel Cactus, Ocatilla, and the Smoke Tree or Palo Blanco.

Group prepared under the immediate direction of Paul J. Fair.
Background painted by Charles Bradford Hudson.
Photo by Gabriel Moulin.

PROCEEDINGS

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VIII. Report of the Director of the Museum for the Year 1915. (*Issued May 4, 1916*) ... .25

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IX. Report of the Director of the Museum for the Year 1916. Plates 3–17. (*Issued June 23, 1917*) ..... .25

The Academy cannot supply any of its publications issued before the year 1907, its entire reserve stock having been destroyed in the conflagration of April, 1906.

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